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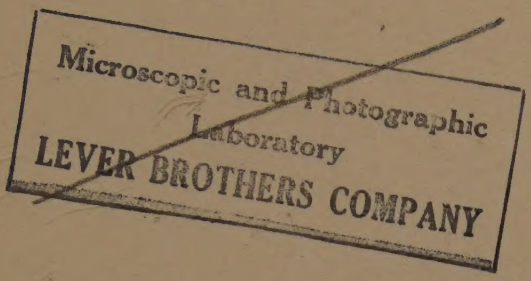

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A TREATISE ON THE AIR BRUSH

A TREATISE ON THE AIR BRUSH

WITH PROGRESSIVE LESSONS

BY
SAMUEL W. FRAZER
AND
GEORGE F. STINE

Microscopic and Photographic
Laboratory
LEVER BROTHERS COMPANY

BOSTON
AMERICAN PHOTOGRAPHIC PUBLISHING CO.
1930

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PREFACE

Anyone desiring to use the air brush, either for pleasure or for profit, should find the instructions and the series of progressive lessons contained in this book very helpful and complete. They are the fruits of practical experience and are written by experts.

This volume is a combination of two books on the use of the air brush, both now out of print: " Treatise on the Air Brush, with Progressive Lessons," by Samuel W. Frazer, published in 1915, and " The Air Brush in Photography, Incorporating a Progressive Series of Lessons," by George F. Stine, published in 1920. Nothing of importance in either book has been omitted, but duplication has been avoided and much new matter added. It will be found that in the arrangement of the progressive lessons the first ones are devoted to the acquiring of a general fundamental knowledge of air brush work, and these are followed by lessons which give detailed instructions for its use in photography, both positive and negative work. The original illustrations have been included and some new ones added.

The air brush is an instrument with practically unlimited possibilities, as is evidenced by its use by designers, engravers, lithographers, show card writers and others besides photographers. Similar instruments called sprayers, in which oil, shellac, etc., can be used, are now being used in finishing such things as automobile bodies, furniture and plaster casts, and for interior decoration, etc.

To become an expert air brush artist takes time and effort. Considerable practice must be given to mastering its use and acquiring good control, but the many ways in which it can be employed and the interesting results that can be secured make it well worth while to devote considerable time and trouble to acquiring the necessary skill.

Those who are interested in colouring photographs will find the chapters dealing with this particular use of the air brush very interesting and complete.

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Part I

THE AIR BRUSH AND ITS USES

By SAMUEL W. FRAZER

INTRODUCTORY

The air brush has been greatly misunderstood by artists who have never used it and by some who have used it but have not been able to master it. This book has been written to enlighten the first class of artists, to help the second, and to prove to others that the air brush is a genuine art tool. It will not take the place of brains, but by using it with brains, work can be done that the hand worker never has and never can approach. As a means of retouching photographs for reproduction, it is preëminent. For finishing portraits or prints, it is the only practical method. Bromide prints cannot be coloured or finished with any degree of success without it, as the greasiness of the surface of the print prevents the free flowing of the color when applied by hand. Marvellous effects can be produced in sign-writing. It is used extensively in making post-cards and candy-box covers, with the aid of masks. Large photogravures, artotypes, and all kinds of reproductions can be coloured much more quickly and better by a skilled air brush artist than could possibly be done by hand. There are very few branches of picture-making in which it is not used very extensively. The sign-writer does his best work with the air brush and gets the best prices for it. And numbers of art workers find the air brush invaluable for finishing watercolours and wash drawings. If the sky in a picture is too cold in tone the air brush can be used to warm it without changing values. Artists who make magazine covers use it extensively. Miniature artists also find it of great value. In fact, its uses are too numerous to mention.

There seems to be, however, some misunderstanding as to the value of the air brush in photography. As a matter of fact, it is just as valuable and necessary in the photographer's equipment as it is in that of the artist, and in many cases more so. The use of the air brush for the distribution of colour places opportunities before the photographer such as he never had before to keep abreast and even ahead of the times; it opens the path for new ideas and effects and most of all for the use of individuality. If the photographer uses individuality, producing ef-

fects that are attractive and pleasing, then the returns are sure to be of value, but to produce such effects one must think, study and work. It is the " drifting-backward " photographer who, realizing the success of one who has thought, studied and worked while he idled leisure moments away, offers the excuse that the successful photographer is a genius. In connection with the above I can do no better than quote the true words of Van Amburgh: " Genius is the answer you get to the things you do while the world sleeps." Therefore may the information given in this book awaken those who for years have been asleep to the opportunities that confront them and enable them to place before the public photographs that are worthy of the name.

The photographer who uses the air brush in his studio soon finds, after he has thoroughly mastered its use, that he can produce effects on photographs that would otherwise be practically impossible. He will find the air brush worth every dollar it may cost in the making of good vignettes where possibly the background has turned out to be thin and transparent. This can be filled in directly upon either the emulsion or the glass side of the negative. Then, too, on a negative in which the lighting is flat or where the whole negative may lack brilliancy, the air brush can be used and high lights and shadows can be built up to suit one's wishes, on either side of the negative. If the photographer wishes to work in a background, this can very easily be done by means of the air brush. Numerous other uses to which the air brush can be applied will suggest themselves to the alert photographer.

Being a delicate tool and doing delicate work, patient and persistent effort must be applied to the mastery of it. A great many use the air brush, but comparatively few really master it.

Given a fair knowledge of drawing and colouring, anyone who follows faithfully the lessons in this book may become a master. The pupil will do well to follow the lessons consecutively, as they are the result of long experience gained by drilling pupils singly and in classes.

CHAPTER ONE

GENERAL CONSTRUCTION AND THEORY, WITH DIRECTIONS FOR THE CARE OF THE AIR BRUSH

The air brush is a combination of two valves so arranged that by means of compressed air a fine spray of colour is projected upon the surface to be worked upon. One is a needle valve, which, when open, allows the colour to be projected by means of a jet of air. The other is an air valve opened by a plunger controlled by the pressure of the finger. The needle valve, when opened by pulling the finger-piece back very slightly, allows a tiny stream of color to be sucked through when the air goes past it, making on the work a line as fine as a hair. Pulling the finger-piece farther back opens the valve still more and allows more colour to be sucked through, making a spray that varies according to the extent the valve is opened. Downward pressure opens the air valve to its fullest extent. An experienced artist becomes so proficient that he instinctively allows just the proper amount of air to go through that is needed for his work. This proficiency comes only with experience. As the needle valve has a very small orifice, the colour must be free from particles of grit and dirt, otherwise the tip will become clogged, and no colour will go through. This necessitates cleaning out the tip, an operation that should be done only when absolutely necessary, as it is apt to spoil the tip, which is delicately constructed.

Almost all models of air brushes have a long, fine pointed needle of German silver held in place so that it passes through the air brush and through a platinum tip at the extreme end. The needle is held by the tube and chuck, and is controlled in its backward and forward movements by a lever operated by the forefinger.

A valve on the air brush controls the air. By a downward movement of the valve lever the air is permitted to go through the air brush and pass on through the air chamber to a junction in the colour chamber, which causes a suction, by means of

which the colour is pulled from the colour chamber when the backward motion has caused the needle to be drawn away from the tip.

The air pressure directs this colour with the aid of the needle, and its volume depends on the distance to which the needle has been pulled.

The artist can increase at will the volume of colour on the surface of his work by pulling the lever backward, or reduce the colour by allowing the spring in the back of the air brush to force the needle forward again.

This combined action, gradually but not rapidly, dulls the needle and in time wears the tip; but these parts may be renewed at small expense.

Inability to obtain a hair line is generally sufficient indication of a dull needle. A new needle must then be supplied in order to obtain the best results and to preserve the tip.

The construction of these essential parts is delicate and they are small, allowing but little space between the tip and the needle, so that care must be taken not to try to force too thick a colour through the air brush. Colour should not be of greater consistency than that of waterproof drawing ink. If the best results are to be obtained, it is, therefore, necessary to build up the body colour or tint by repeated spraying with a colour of thin consistency until we have reached the brilliancy or strength desired. This is better than trying to force too much colour through the air brush at one time.

If this is kept in mind, the air brush will take care of the colour nicely and properly. And if well cleaned out after each colour is used, the perfect working of the air brush is assured.

The air brush must at all times be kept in condition, so that it may always be ready for use in any emergency that may arise. This means that care must be given to its upkeep and maintenance, principally in keeping it clean. This is nothing new; ordinary brushes commonly used by artists are cleaned, or should be cleaned after using, before applying the same brush to another use. To neglect to clean your air brush after use may result in its being unfit to use next time it is wanted.

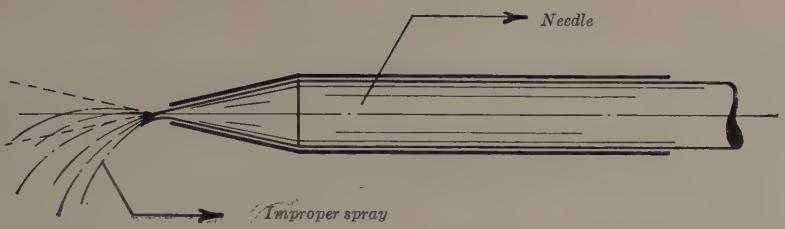


Fig. 1. Showing Effect of Bent Needle

To clean the brush thoroughly, immediately after use, flush the colour chamber two or three times with water and as a precaution against clogging, it is well to send a final wash of alcohol through it. By taking great care to clean it thoroughly after use, it is possible to use oil paints, varnishes, shellacs, etc., in the air brush.

A good way to prevent trouble is to strain every bit of colour that is to be used in the air brush through a fine brass sieve such as is used for straining gasoline. All colours should be kept in bottles and these should be well covered to keep out dust. A dropper similar to those used for filling fountain pens is the best thing to use for putting the colour into the colour cup. Never use a paint brush, as the hairs are liable to come out and get into the tip and clog it. Cover the end of the dropper with a piece of rubber tube so that, if the dropper should fall to the bottom of the bottle, the rubber tube will prevent any small pieces of glass from chipping off and making their way into the air brush. Such an accident is very likely to put the air brush out of commission and, if not removed, the piece of glass will spoil the tip. If this should happen, procure a piece of 00 mandolin wire and carefully insert it in the front of the tip, after taking out the needle. This will usually dislodge the piece of glass or other obstruction. Then apply the air tube to the cap, and blow it out backwards. Never allow anything to touch the end of the needle. It is very sharp and fine and a slight touch will bend it and cause a spray that is uneven and coarse, as in Fig. 1. Always clean the brush with water, on leaving it, so that the colour will not cake up in the cup.

If the brush has not been cleaned properly and the colour has caked around the needle it may be necessary to use the

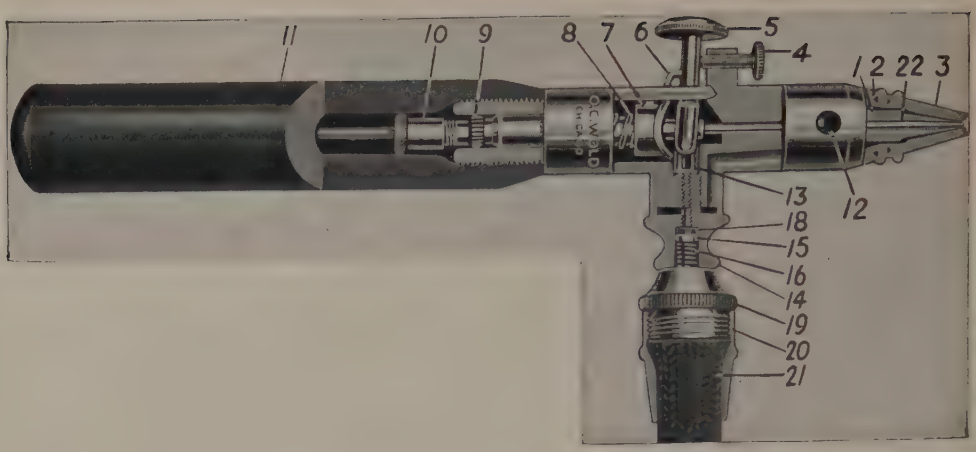


Fig. 2. General View of the Inside of a Popular Type of Air Brush

1. Colour Tip; 2. Air Cap (Inner); 3. Outer Air Cap; 4. Line Adjustment Screw; 5. Main Lever; 6. Auxiliary Lever; 7. Needle Tube Guide; 8. Needle Spring; 9. Needle Bearings; 10. Needle Chucking Cap; 11. Handle; 12. Colour Cup Inlet; 13. Plunger Bearing; 14. Valve Casing; 15. Air Plunger; 16. Air Plunger Spring; 18. Rubber Valve Washer; 19. Hose Connection; 20. Hose Chuck; 21. Cloth Covered Hose; 22. Needle.

reamer to remove the obstruction. I wish to impress upon the reader the fact that the reamer should never be used until all other methods of eliminating the trouble have failed, for the reason that the colour tip is tapered and also the end of the needle which fits into this taper. The reamer, being tapered to conform to the taper of the tip, and being very sharp and hard, will, by continued use, ream out the taper in the colour tip, thereby giving the operator a full flow of colour at all times, regardless of attempts to regulate it. If caking of the colour should occur, first of all fill the cup, Fig. 3, with water and work the needle back and forth by means of the double action air and colour distributing lever (Fig. 2) until it is clean, or, if water fails to answer the purpose, fill the cup with wood alcohol and proceed the same as before. The alcohol has a tendency to dissolve the colour more rapidly than water. If after trying these methods, one does not get results, then, and then only, resort to the reamer and proceed carefully as follows: Remove the handle and take out the needle by first loosening the needle chucking cap and then drawing the needle straight out, being very careful in removing and replacing the needle that nothing

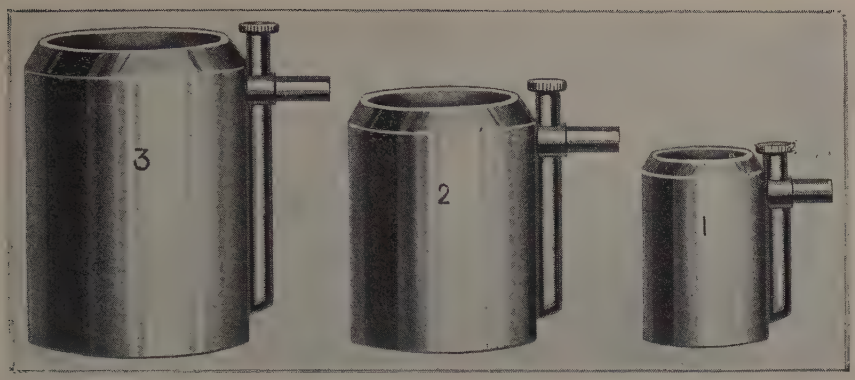


Fig. 3. Metal Tube Colour Cups

comes into contact with the point, as on it depends the success of the spray. After the needle has been removed, insert the reamer with the tapered tip first, Fig. 4, turning the reamer to the left while inserting it. At intervals remove the reamer and draw through the tip a piece of fine silk, then again insert the reamer as before. Repeat this operation until you find the reamer projecting through the colour tip the same as the needle. Never force the reamer into the colour tip hard enough to cut away any of the metal of which the tip is composed, or the brush will be ruined.

It should be remembered that water colours contain gum which, upon drying, becomes very hard. Therefore one should be exceptionally careful in cleaning the brush after using colour.

If the brush throws colour upon the work in spots, or, as the worker would say, " the brush spits," the colour may be too thick, or the air cap may need cleaning. The colour may contain grit, etc., or perhaps the colour has been allowed to dry in the brush or cup. In any event these parts should be thor-

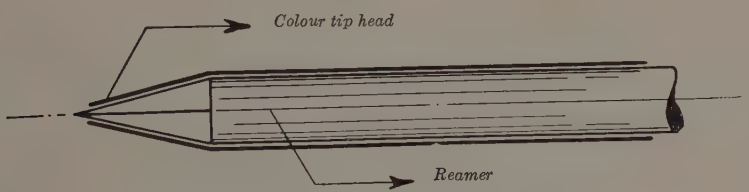


Fig. 4. Reamer Inserted in Brush

oughly cleaned. If oil, water, grease or dirt of any kind is thrown upon the work by the brush, it should be disconnected and the tank and air line thoroughly blown out. This cleaning should be done without fail at least once a month to be sure of avoiding trouble. If, however, the liquid carbonic gas outfit is used, this cleaning of the tank will not be necessary, but when connecting a new gauge and hose to the brush, they should be blown out thoroughly, especially the hose, as the rubber is usually coated with fine powder, and if this powder lodges in the brush, there is no end to the trouble it may cause.

If the colour suddenly stops while one is working, after the proper flow has been set, turn the brush toward the floor, away from the work, at the same time pressing the lever down to its maximum and drawing it back as far as it will go. Repeating this several times usually frees the colour passage of the obstruction, which may be a little grit or possibly thick color. If the colour is too thick, the above trouble will occur very frequently.

If the colour falls upon the work in a very coarse spray, even though the colour used is in perfect condition and the line adjusting screw set for the proper amount of colour, then the needle is bent or the colour tip is split or roughed in some way, and the needle or colour tip or possibly both should be renewed.

If air comes and no colour, the cup is clogged or the tip is plugged with dirt or thick colour and should be reamed out, and clear water run through the brush, or, better still, diluted ammonia or alcohol.

If no air comes, the brush needs a new rubber washer in the air valve, or the pump has sucked up some dirt from the floor, and deposited it in the air passage. In the latter case the remedy is to take off the head and clean it.

CHAPTER TWO

AIR SUPPLY AND GAUGES

There are several methods that can be used to supply the air; the liquid carbonic gas outfit, the automatic pump which is electrically connected and has a small tank with pump attached for operating by hand, or the tank connected with pump for operation by foot pressure.

Any of the above methods may be used, but experience has taught air brush workers that the foot and hand pressure methods are in no way to be compared with the automatic pump or the liquid carbonic gas outfit for the reason, as anyone experienced in such work knows, that, in order to do good work, one must have good control of the brush, which is impossible if the hand or foot method of supplying the air is used. It has been found that by the time the artist has produced sufficient pressure by means of the foot pump he is quite unfitted, owing to the energy put forth, to do his work properly. The exercise places the worker in a slightly nervous state, thereby causing him to do inferior work. In many cases this effect is not realized by the individual, nevertheless it is present and makes itself apparent in the finished work. A foot pump, perhaps, is of some value when a small amount of work is to be done at home, but it cannot be recommended for daily use.

The automatic tank, electrically connected, is a good method, but to maintain a constant and steady pressure it will be found that there is no method to equal the liquid carbonic gas outfit. To use these tanks, it is necessary to purchase a pressure reducing gauge which is furnished complete with hose connection, wrench and bracket for the air tank (Fig. 5).

The proper air pressure to use under ordinary conditions is about twenty-five to thirty pounds, and this is the pressure that we recommend should be used in the lessons which will be found in subsequent chapters. However, this is a matter that must be decided by the individual, as observation has shown that the number of pounds of pressure is comparatively unimportant as long as the pressure is even. It is not so important

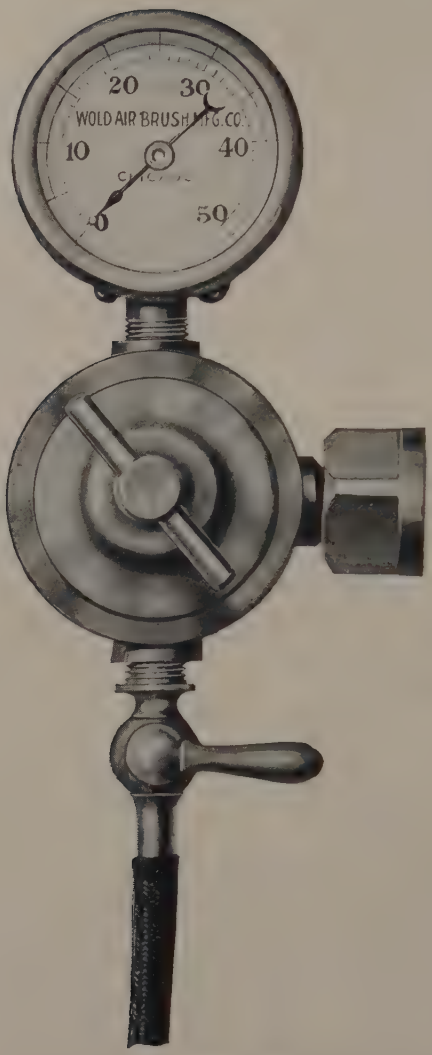


Fig. 5. Gauge for Liquid Carbonic Gas Outfit

to establish a stated pressure as it is to have the pressure uniform at all times, and for this reason we advise the use of the carbonic gas outfit or an electric compressor whereby it is possible to maintain the air supply at an even volume (Fig. 6).

The gauges on whatever outfit one selects can be purchased from any of the various air brush manufacturers, although with the hand and foot or electrically connected outfit the gauge is included. This is not the case with the liquid carbonic gas

FIG. 6. VARIOUS TYPES OF COMPRESSORS

A. Hand Pump; B. Foot Pump; C. Liquid Carbonic Gas Outfit; D and E. Electric Air Compressors; F. Studio Compressor Unit.

tanks, which are commonly known as forty or fifty pound drums of gas, and can be purchased at a nominal figure in practically any town or city. These tanks are delivered and called for when the gas has been used. It is well to remember that when a drum of gas is purchased, the drum is the property of the vendors and all that one purchases is the gas contained therein.

The connections to practically all of these tanks are standard. Therefore this need not be considered when purchasing a gauge or tank. The method of regulating the pressure gauge is clearly explained in the directions accompanying it.

Suggestions to Those Who Use the Electric Compressor

When you have received your electric outfit (Fig. 7), put it in some place as far from interference as possible. If it can be placed in a dust-proof casing we would advise doing so, as dust in motor and pump bearings is apt to add materially to their wear, and cause trouble. Place the outfit on a firm base, as it should not rock from its own vibration while running. It might be well to place a piece of carpet, felt or rubber, between it and the floor as a means of deadening the vibration. If the outfit is placed on a shelf, see that the shelf is firm and substantial. Do not permit the outfit to be in such a position that clothing or anything else of that nature may be hung near the fly wheel. Attach the wire to any electric light socket handy, and if wiring connections have been properly installed the outfit should be instantly ready for use.

To insure the life of the compressor the bearings must be kept well lubricated. Use a good grade of oil, putting three or four drops in the oil cups (unless grease cups are furnished) every morning before starting the pump. Do not oil the motor if it is fitted with grease cups. It is well to inspect the grease cups every two or three months and refill them when necessary. When the current is turned on, should the belt slip, this is occasioned either by the belt being too loose on the pulley or by the compressor being started under pressure. To remedy this either tighten the belt by shortening it or use a little belt dressing which is frequently all that is necessary. Do not forget to turn off the current before leaving at noon and particularly at night.

Suggestions on the Use and Operation of the Liquid Carbonic Gas Outfit

The carbonic gas outfit consists of a powerful steel tube containing liquid air compressed to a high degree, generally about 1500 to 2000 pounds to the square inch. This is sufficient under ordinary conditions to supply air for one air brush for a period of from four to six weeks, using the air brush, say, four hours

Fig. 7. The Wold No. 7 Electric Air Compressing Outfit

a day. As the cost of refilling these drums is in most cases only about two dollars, this source of power is really very economical and saves the effort needed to compress air by hand or foot power. When only one brush is used we strongly advise the use of the carbonic gas outfit. It is sometimes supposed that these outfits are dangerous. Let us correct that idea by saying that if the directions furnished with them are followed to the letter, not only will no danger ever come from the use of gas, but the outfit itself will last a lifetime. Though the chemical term "gas" is applied to the contents of this drum, this particular substance is neither combustible nor injurious to health.

Occasionally one notices watery spots not unlike drops of greasy water on the surface of the work. This happens to the users of carbonic gas as a usual thing and has nothing to do with the air brush itself. Sometimes this condition comes from a dirty or rusty condition of the tanks attached to the air compressor installed. In the former event there is little that can be done unless a change in the source of supply betters this condition. But in the latter case you should open up the drain cock

and let the compressed air in the tank escape with all the force possible, which will take out with it practically all the water, greasy, rusty or otherwise. This should be done three or four times a year, not only to keep these spots from looming up at just the wrong, and usually the busiest, times, but to allow the foreign matter to be taken away from the place where it may cause trouble to the air brush.

The moisture and oil from the tank coming through the tubing rapidly rust the springs and ruin the washers in the valves, which sooner or later means that rust, or parts of the rotten washers, may get into the air chamber, and this means a trip to the factory.

As previously mentioned and to reassure the reader that there is no danger in the use of these gas outfits, we will say that we have never had any evidence brought to our attention of an accident which has occurred to the operator who has used liquid carbonic gas as the means of furnishing air pressure for his air brushes, if the following rules have been observed.

RULE ONE: Connect the reducing valve to the drum of gas. In doing this it is well to insert one or two washers to insure an absolutely tight connection to prevent possible leakage.

RULE TWO: When the proper connection has been made, close the air cock on the regulator leading to the tubing, and screw outward or downward the valve seat or regulating screw until all pressure is removed therefrom. If this screw should be accidentally withdrawn, replace it, giving it a couple of turns inward until some back pressure is felt.

RULE THREE: Now with the wrench turn on the gas. This is done by opening the valve in the top of the gas drum. This valve stem is square in every case, being about five-eighths of an inch wide and is generally protected by a large hexagonal ring inclosing it. Do not use either end of the wrench in opening this valve. Use the square opening in the centre of the handle. You are sure to be right in that case, as the openings in the wrench on both ends are intended only to attach or detach the regulator to or from the gas drum.

RULE FOUR: When the gas has been turned on, oftentimes

no pressure at all will be indicated by the dial of the gauge because of the fact that the regulating screw has relieved all pressure. Should any pressure show on the dial, wait until the indicator becomes stationary before increasing the pressure. This is done by screwing the regulating screw underneath, slowly inward to the right. A higher pressure is obtained by screwing this regulating screw further inward. This should be done very slowly so as not to increase the pressure beyond the intended amount. We have previously stated that the best results are obtained with from twenty to thirty pounds' pressure.

RULE FIVE: This rule is the one which requires careful attention, and caution should be used. Infringement of this rule might result in breakage of the outfit. *Never screw outward* the valve seat or regulating screw while any pressure shows on the dial. For instance, if the dial shows thirty pounds and only twenty pounds is wanted, immediately shut the gas off in the drum. Never attempt to obtain the lower pressure by screwing the regulating screw outward until the gas has been shut completely off and exhausted in the regulator by opening the air cock leading to the rubber tube. When this has been done no pressure should show on the dial. Then proceed again as in Rule Two.

RULE SIX: When the desired pressure has been obtained and shows on the dial, it is never necessary to disturb the adjustment of the regulating screw again. The air brush tubing should now be attached to the air cock and to the nipple connections intended for the air brush. On opening the air cock you are now ready for work. As a precaution and to save possible leakage of gas, the suggestion is made that the gas be shut off in the drum whenever you cease work for any length of time.

CHAPTER THREE

"DON'TS"

1. Don't lose sight of the fact that the air brush is a mechanical tool, somewhat delicately made, and must be treated as such to insure its efficiency.

2. Don't forget that the air brush is not and cannot be made foolproof.

3. Don't attach your air brush to new tubing without first blowing a goodly pressure of air through the tubing to clean out any foreign matter that may be in it.

4. Don't try to paint the colour on by running thick colour through the air brush. Let the colour be only about as thick as waterproof ink.

5. Don't forget to clean out your air brush thoroughly after use, particularly before laying it aside for the night.

6. Don't lay the air brush down on the table, or easel. Hang it up in the hanger furnished for the purpose.

7. Don't lend your air brush any more than you would lend your watch. Others might not take the time or trouble to clean it or care for it.

8. Don't try to run through your air brush any colour that is not soluble in water, without cleaning it with benzine at once, unless it be a model designed for such work.

9. Don't permit the air brush nose to come in contact with your work, as the point of the needle protrudes unprotected through the tip and the slightest contact with any object bends the point and consequently ruins it.

10. Don't put your finger over the nose of the air brush to see if the needle is sharp. You can easily determine this fact by close examination with the eye or a reading glass.

11. Don't put any oil in the valve of your air brush to make it run smooth. Oil rots the rubber washers and causes them to fall to pieces, thus clogging the air chamber and causing the valve to leak.

12. Don't run to the first "friend" you may think of who has an air brush, if yours happens to get out of order, and ex-

pect him to fix it for you. He may not know any more about it than you do yourself, and might do more harm than good.

When in doubt write the manufacturers of air brushes for advice or SEE SOME ONE WHO REALLY KNOWS.

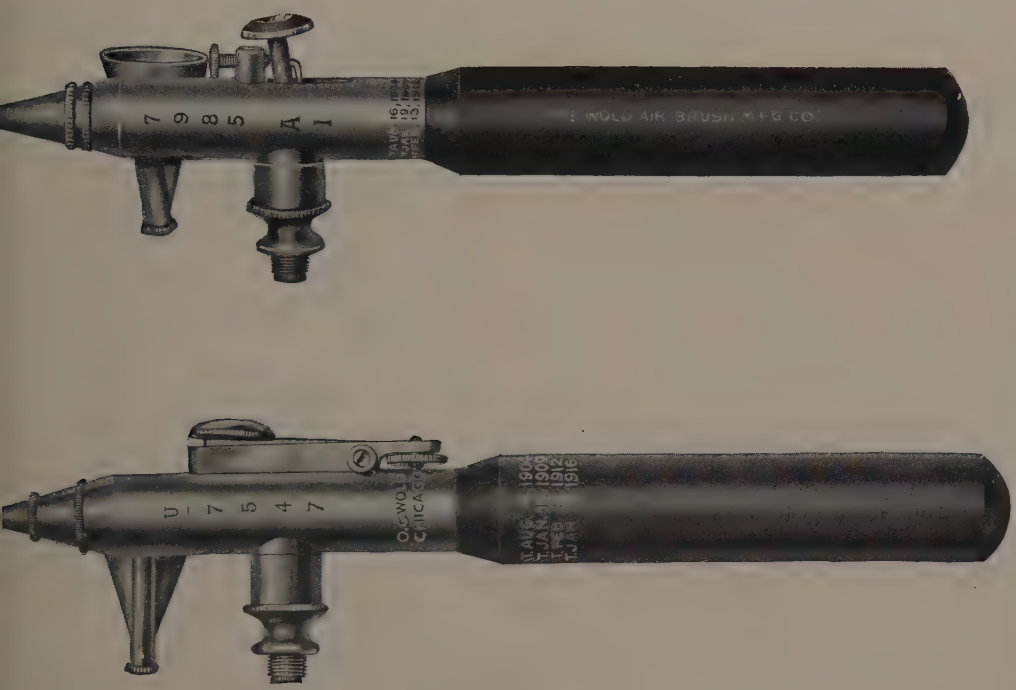


Fig. 8. Wold Air Brushes, Types A-1 and U

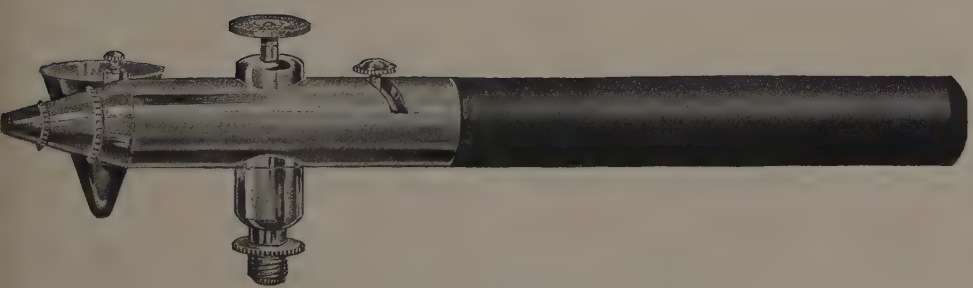


Fig. 9. Model A Fountain Air Brush
(Thayer & Chandler)

CHAPTER FOUR

COMMON TYPES OF AIR BRUSHES

Now in Use among Portrait Artists, Illustrators, Photo Retouchers and Show Card Writers

When an air brush is to be purchased the worker can use his own choice without fear of selecting an inferior brush, for the simple reason that all the different makes are good and partiality can be shown to none. Even though the designs may appear to be radically different, the working principle is the same and the results, of course, are identical. The cuts given below (Figs. 8 to 12) illustrate some of the leading makes of air brushes, any one of which would be found to be entirely satisfactory.

Fig. 10. De Vilbiss Air Brush

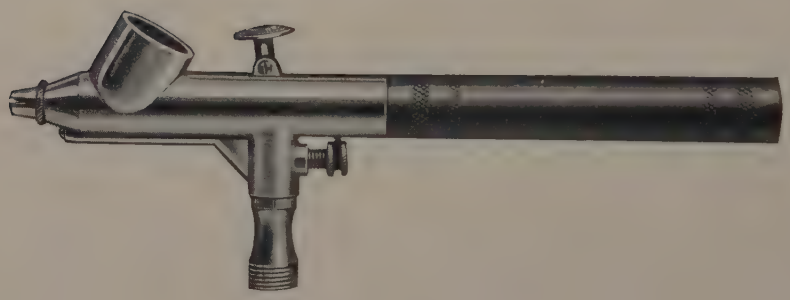
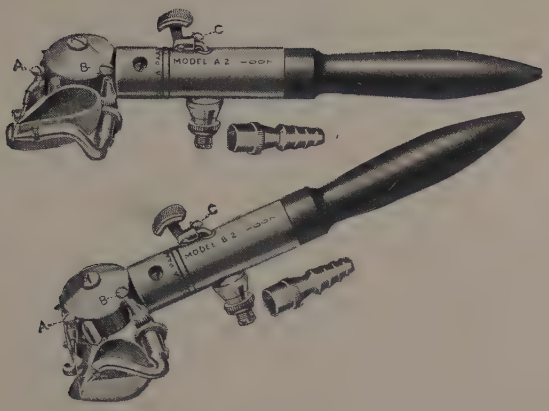


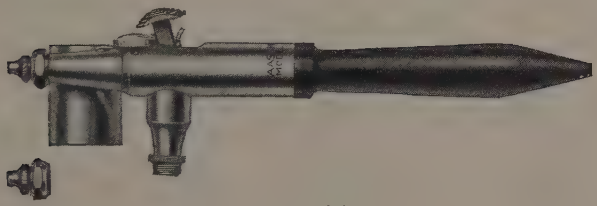
Fig. 11. The Aerograph



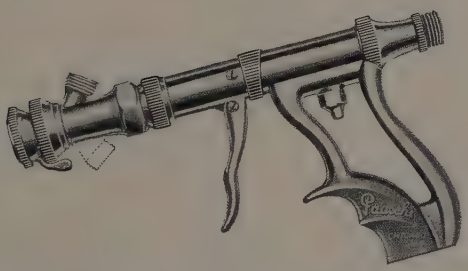
Types A and B

Syphon Cup

V Type with Gravity Feed



Type M



Universal Multiplehead Air Brush

FIG. 12. PAASCHE AIR BRUSHES

CHAPTER FIVE

PRELIMINARIES TO COMMENCING THE LESSONS

In beginning to use the air brush, after the air supply has been provided for and the pressure regulated on the gauge, connect the brush to the hose leading to the gauge and open the gauge valve, allowing the air to enter the brush. Connect the colour cup to the side of the brush by simply pushing the tube of the cup into the opening found on the side of the brush. It will stay in place by friction. Before testing the flow of air, see that the line adjusting screw is drawn back far enough to allow the distributing lever to rest against the projecting tip through which the line adjusting screw passes. Then remove the handle of the brush, loosen the needle chucking cap, and tap the needle lightly to ensure a perfect fit of the needle into the

Fig. 13. The Correct Way to Hold the Air Brush

Fig. 14. An Incorrect way to Hold the Air Brush

colour tip, then tighten the needle chucking cap and replace the handle.

Most artists work at an easel which is nearly upright or which leans away from the worker at an angle of about eighty degrees. The worker should seat himself directly in front of the easel (Fig. 15) and take hold of the brush as best he can, with the first finger resting upon the colour distributing lever and the brush at right angles to the easel. The hand should hold the air brush easily but firmly as shown in Figs. 13 and 16. Nothing will tire the hand so much as a stiff, cramped position such as in Fig. 14. The hand should wave in a segment of a circle, back and forth, as shown in Fig. 17. This allows the spray to be strongest at the point where the circle is nearest the paper, which is as it should be, causing the beginning and end of the

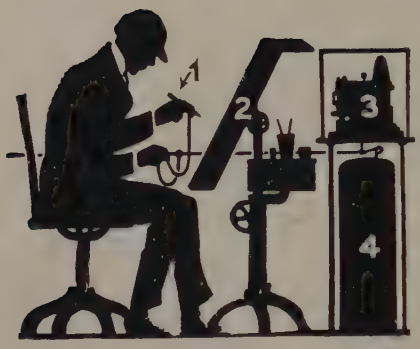


Fig. 15

Fig. 16

strokes to be slightly diffused. At first the brush should be about half an inch away from the practice sheet. It should be moved in a horizontal direction and while it is in motion the colour lever should be pressed forward and downward. If by this means no line is made, give the line adjusting screw a few turns and try the same thing again. If too light a line appears, give the regulating screw another turn or two until the desired flow of colour is produced. The farther one draws the colour distributing lever back down, the greater will be the flow of colour until the maximum flow of the brush is obtained. This greater flow of colour is caused by the needle being drawn out of the taper in the colour tip, and the more the two are separated, the larger is the opening through which the colour flows. The valve, as has been stated in a previous chapter, is a needle valve, the principle of which should be clear from this explanation.

After one has succeeded in setting the flow correctly for practice work, it will be found that the hose connection is rather a drawback to the free movement of the arm and often the worker takes hold of the tube with the other hand to remove the weight from the hand in which the air brush is held. ***This should not be done,*** although at first it seems to be a help. It

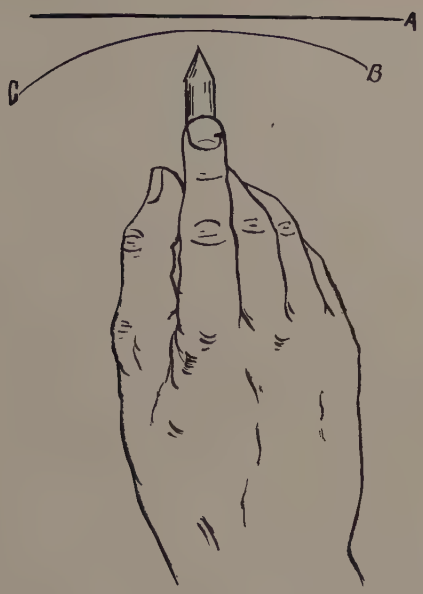


Fig. 17

will later be found to be a hindrance, because in the successful manipulation of the air brush one requires the free use of both hands and arms. The brush should always be held at right angles to the surface being worked upon, for if the spray should strike the surface at an angle it will shoot off to parts where it is not wanted, whereas, if it strikes the paper squarely and at right angles from all sides, the spray will stay just where it first hits.

An artist who expects to sit all day at his work should accustom himself to a posture and a method of holding the air brush which will give him the maximum of ease and efficiency. The back should be as straight as possible in order to allow the blood to circulate freely.

Explanation of Fig. 17. The line A represents the surface of the paper being worked on. The curved line, B C, represents the course the air brush point should take. This is the view obtained by looking down on the top of the hand. The length of the line B C indicates the comparative length of stroke when working on rather large work. For smaller or finer

work the stroke should be considerably shortened, but the course or general direction of the stroke should be the same, and the brush should always be at right angles both vertically and horizontally. To prove that this is necessary, hold the air brush close to a piece of paper at an angle other than a right angle and turn on a small amount of colour. The colour will tend to shoot off in the direction in which the brush is pointed, running ahead of the air and causing that side of the mark to be diffused.

It is suggested that at this point the student begin with the progressive lessons on page 74, and thoroughly master the first fifteen lessons. These will give him the experience that is necessary to enable him to master the details of the succeeding chapters. The rest of the lessons are intended more especially for photographers and photo-engravers, though their mastery will prove useful to any air brush operator.

CHAPTER SIX

HOW TO USE FRISKET PAPER

Frisket paper is a paper used by artists and designers for masking when working on photographs or sketches. The paper is tough and thin, and is rendered transparent by being immersed in a waxing solution. This also makes the paper waterproof, which is a very necessary feature. The paper is of such a nature that it cuts readily and still is very tough. An extremely sharp and pointed knife is used to cut the frisket paper so that it may be readily removed from its surroundings. The method of using the paper is as follows: a good grade of rubber cement is used to hold the frisket paper to the photo-

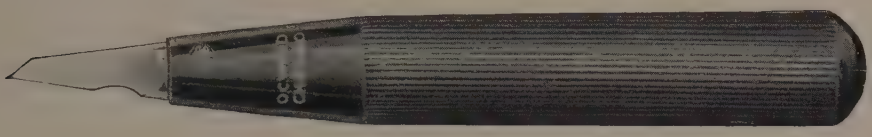


FIG. 18

graph or sketch. All rubber cements are not good. One that has a low grade of gasoline as a solvent should be avoided. The oil in the gasoline is very apt to stain the work, especially if the cement is allowed to dry or even to stay on more than an hour or so. If a good cement is used, one that is clean and free from oil or other foreign substances, it may be allowed to dry without any fear of its damaging the paper. It takes remarkably little cement to hold down quite a large piece of frisket paper. The cement is first dabbed on the pencil drawing or photograph in several places. The frisket paper, cut to the proper size, somewhat larger than the part to be masked, is laid down on the face of the sketch or photograph. A ruler or other instrument with a straight edge is used to smooth out the frisket and this of course will spread the cement evenly and smoothly over the whole surface between the frisket and the drawing. The frisket will be held in place partly by the adhesive qualities of the cement and partly by the vacuum created between the two surfaces. When the cement is evenly

distributed the paper is ready for work. An extremely sharp and pointed knife (Fig. 18) will be needed to cut along the outlines of the sketch or photograph. A very light pressure is all that is required for cutting. In fact a very slight scratch will do the work. It is desirable that the drawing or photograph be not cut or scratched in the process.

CHAPTER SEVEN

PHOTO-RETOUCHING

Commercial photo-retouching is the art of painting on a poor photograph to bring out all the details desired. Owing to poor lighting conditions or to the interference of other objects near the objects being photographed, it is often impossible for the photographer to secure a first-class negative and it then becomes necessary for the photo-engraver to employ highly skilled artists who are able to paint on the photograph the details lost to the camera.

The term photo-retouching should not be confused with negative retouching, the latter being a process used by photographers for improving negatives. Photo-retouching in the sense in which it is meant in this treatise is the process of preparing a photograph or drawing for reproduction by the half-tone photogravure process.

The purpose of retouching is to make a photograph snappy and clean, accentuating the parts it is desired to show clearly, so that a good bright half-tone cut can be made from it. It is rare that an unretouched photograph can be made that will reproduce in such a manner as to be satisfactory to the manufacturer. He usually wants a cut to show clearly every part of his wares. A good photo-retoucher in any line receives good pay. There is practically nothing in the line of merchandise that does not come under the retoucher's hand, from a card of buttons to a giant engine.

For a great many years such work was done by hand, on a photograph or a sketch. When the air brush was brought out, artists at once saw the advantages of it, and the results from its use were seen to be greatly superior in every way to work done by hand.

The outsider often has some difficulty in understanding just why a good photographic print cannot be used without invoking the aid of the artist. It is often impossible for a photographer to get just the exact lighting, point of view, and rendering of texture that is considered desirable by the manu-

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facturer to exploit his goods. Take for instance a photograph of a piano, finished in black. The reflection of light objects in the polished surface will completely spoil its beauty. Any surface that is varnished or polished will act in this way. All such defects have to be removed. Of course when an object is removed from its surroundings these defects are very much more noticeable than otherwise. Attempts to do away with reflections are made more or less successfully by the photographer. Cut glassware is one of the most difficult classes of goods to photograph, and many attempts have been made to prepare the glass so it will give better results. A very successful way is to cover the ware with a light blue opaque (a mixture of designer's white and a small quantity of Prussian blue watercolor) applied with an air brush. Many experiments have been made to do away with objectionable reflections, among them being the placing of the glassware in boxes lined with black velvet, and other similar contrivances.

Stoves are also difficult to photograph successfully and the polished nickeled surfaces are covered with black lead before having them photographed. Soap is also used to dull the bright surface. But the artist is the final arbiter. He will take his trusty air brush, and by using black and white of varying shades, will do away with all defects.

Retouching is done by means of masks to a great extent, after which the small parts are finished by hand. The directions given for treating the cylinder in lesson twelve will show in a general way how such retouching is done, and more detailed information will be found in the chapter on "How to Use Frisket Paper."

A simple example of retouching is given here. (Figs. 19 to 22.) This cut is similar to thousands shown in catalogs. It is called a mortise flush bolt. A little time spent on this example will give the student a practical idea of just how to go to work to get results. The first thing to do is to draw an accurate outline of the article on a smooth white paper with a medium hard lead pencil as nearly like the outline sketch as possible.

Have ready a sheet of frisket paper, some good rubber ce-

ment, a sharp penknife and a piece of art gum. Flat thumb tacks should be used as there should be no projections to interfere with the work. Place a few drops of the cement on the drawing and lay a piece of frisket paper on top of the cement. The frisket paper should be large enough to cover the sketch with a margin of at least an inch. Spread the cement thoroughly between the frisket paper and the sketch by means of a straight edge such as a ruler or triangle. Work it around until it is smooth and even, with no lumps and no bare spaces. The frisket paper will then adhere perfectly until removed. The sketch may be seen clearly through both the cement and the frisket paper and all is now ready for the next step.

By means of a sharp pointed knife and a metal-edged ruler, cut the line bordering the spaces marked 1, 2 and 3, Fig. 19, putting just enough pressure on the blade to cut the frisket without scratching or cutting the drawing. Now, by means of the point of the knife, lift out the parts of the mask that you have cut, and after allowing the cement to dry, which will take a moment or so, rub off the cement still adhering to the drawing by using either the fingers or the art gum. When all the cement is completely removed, the air brush will be brought into play. Using a good grade of lamp black water colour, spray in the parts from which the masking paper has been removed until a smooth, even tone has been obtained, with a slight tendency towards lightening the parts farthest away, as in Fig. 20. This will aid in rendering the perspective. Use a small spray with a pressure of about twenty-two to twenty-five pounds of air. Next proceed to cut out and remove spaces 4 and 5, and after rubbing off the cement, spray them in carefully, leaving a sort of reflected light at the lower edge of 4 where it adjoins the upper part of 1. Cut out part 6, shading the upper part as shown in Fig. 21. Spaces 7 and 8 may be cut out and sprayed in at the same time. Slight streaks of light help to give an effect of metal. When 7 and 8 are completed to the best of your ability, go on to part 9. To do this in the best manner it will be advisable to turn the sketch sideways. In all of this work, where one part is completed and the next

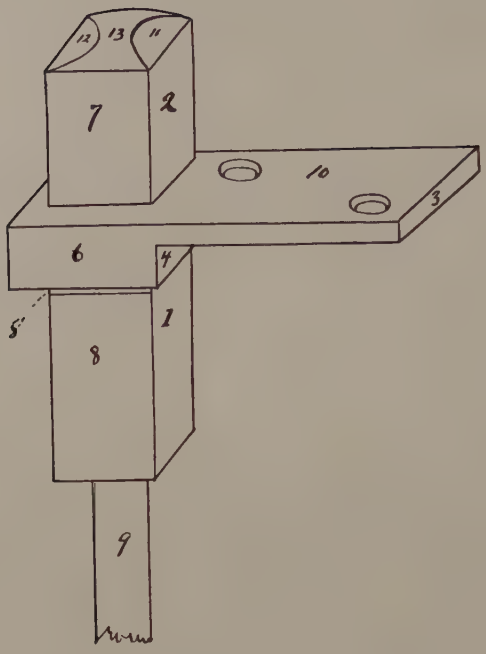

FIG. 19

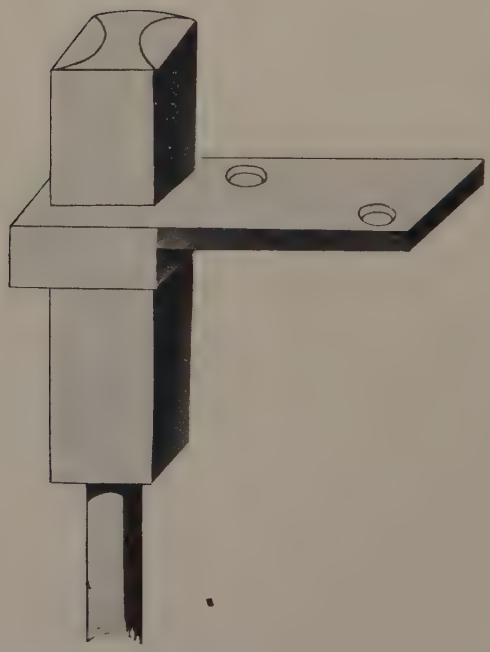

FIG. 20

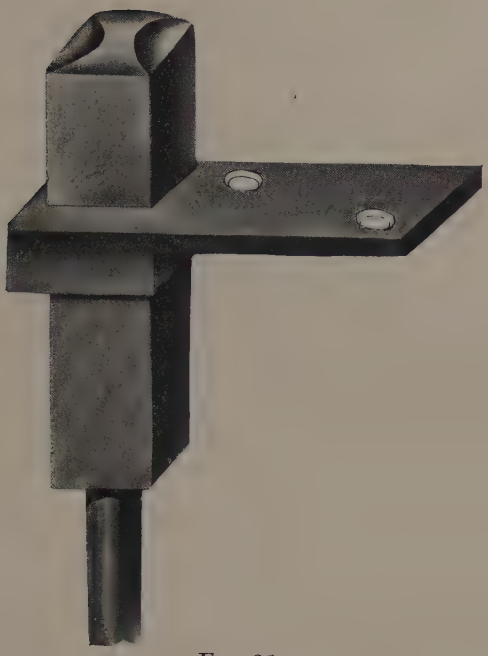

Fig. 21

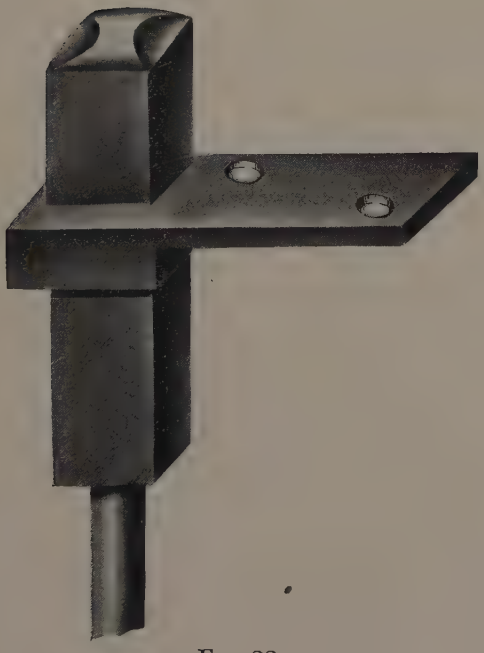

Fig. 22

part to be worked on adjoins it, a straight-edged card will be needed to protect the edge. Care must be taken that the protecting edge of the card is placed exactly where it should be and that it is held firmly in place and in close contact with the sketch. To resume, use a small spray when working on part 9, in somewhat the same manner as in Lesson 12 on the cylinder. The object is to make the shaft look round. The shadow at the top of part 9 is to be put in first with the aid of a card over part 8.

Part 10 may now be finished. The screw holes are protected by leaving the frisket paper cemented over them. Parts 11 and 12 are to be cut out and shaded as shown in Fig. 22. being careful to keep the effect clean and snappy. All work of this sort depends on its contrast and snappiness to obtain the proper effects. When reproductions are made from drawings, some of this contrast is lost. Whites have a tendency to become darker and darks to become lighter. So be careful to make the sketch contrasty. Part 13 may be worked in without the aid of a mask, as what little spray goes over on 11 and 12 will do no harm. The screw holes may be done by hand. After a student has become familiar with this work such small parts may be done with the air brush. The secret of good results is good drawing, careful masking and great care in spraying. It is better to spend plenty of time on preparing masks, even for the tiny parts, than to be careless about them and have to doctor the picture up afterwards.

So far nothing has been said about the use of white or various tints of opaque. It takes considerably more time to work in white and grey, but the experienced artist gets wonderful results in that way. Try with white alone at first, putting in the highlights and the reflected lights. After becoming used to working with white, mix up various shades of black and white, ranging from very light grey to nearly black, perhaps six shades. Some artists use china or glass slabs with partitions, which can be bought in the art supply stores, allowing the mixtures to become dry after using. This method has the disadvantage that it takes a little time to soften the colours for

use, and it also wears out expensive water colour brushes in the process of softening, which is done by wetting a brush and rubbing it over the mixtures. A good method is to procure about half a dozen wide mouthed two ounce bottles. Put in the bottles varying amounts of white and black, so that on mixing them with water the shades will grade from grey to nearly black. A good plan is to place in each bottle a lead top from a tube of colour and add a little water. After putting in the corks the bottles can be shaken and the white and black become well mixed, by the movement of the lead tube top. It is not necessary to be particular about the exact amount of water, as the shade will not vary whether there be a small or large amount of water. More water of course makes the colour thinner but it will not alter the shade when dry. Care must be taken that the mixture be not too thick to go freely through the air brush. Adding a few drops of gum arabic helps the mixture to adhere to the sketch. It may be well to add a warning here, that the air brush must be kept scrupulously clean when using white, as it has a tendency to clog up the front of the brush and the colour cup as well. A pen should not be used in working over or lining out opaque, as it will blot. Use a small pointed sable brush with very little water in the colour and make the strokes quickly and surely.

There is no limit to what can be done in retouching and there is hardly a photograph which does not need some work in order to improve the half-tone engraving to be made from it. In the case of street scenes, when a building is to be shown clearly, sometimes telephone wires and poles cut across the foreground. Such obstructions can be removed, windows, doors, lettering or signs can be strengthened and, in fact, almost any desired result can be obtained. Photo-retouching is perhaps as important as any part of the process of photo-engraving and it takes its share of the credit for the great advancement made in this industry during the past decade.

Fig. 23

CHAPTER EIGHT

SHOE RETOUCHING

The accompanying plates show the method employed in shoe retouching. They show the shoe as it is when first outlined and various steps in the work until completed, showing conclusively that such work would be well nigh impossible without the aid of the air brush.

The first step is to make a careful drawing in outline of the shoe and its various parts. (See Fig. 23.) The size of the drawing is usually two-thirds the actual size of the shoe, though this is optional. The seams and eyelets are next carefully drawn in their proper places. When the artist feels that this is done as well as he can possibly do it, a sheet of frisket paper is attached to the drawing in the manner described in Chapter Six. With a sharp pointed knife, proceed to cut out the vamp of the shoe. Lift out the paper covering the vamp of the shoe carefully, and lay it aside, then rub off the cement that may still adhere to the exposed part of the drawing. Proceed to model in the vamp (as shown in Fig. 24). When this is done to your satisfaction cut out the upper and model as in Fig. 25 laying the vamp mask again in place if desired. Next cut out the heel and sole and model them as shown. Remove the mask and you will find your drawing practically finished with the exception of the hand work, which consists of putting in seams, eyelets, laces, tongue, cap and stitches around the sole. If your shoe is a patent leather, put in the highlights with white. All stitches, seams, and highlights should be brought up very strongly and prominently to insure their being very clear and contrasty in the half-tone.

Particular attention should be paid to the white used. Many so called whites, such as Chinese white and many others, are white when applied, but do not show so when photographed. Be sure and procure a white that is especially prepared for photo retouching.

Fig. 24

Fig. 25

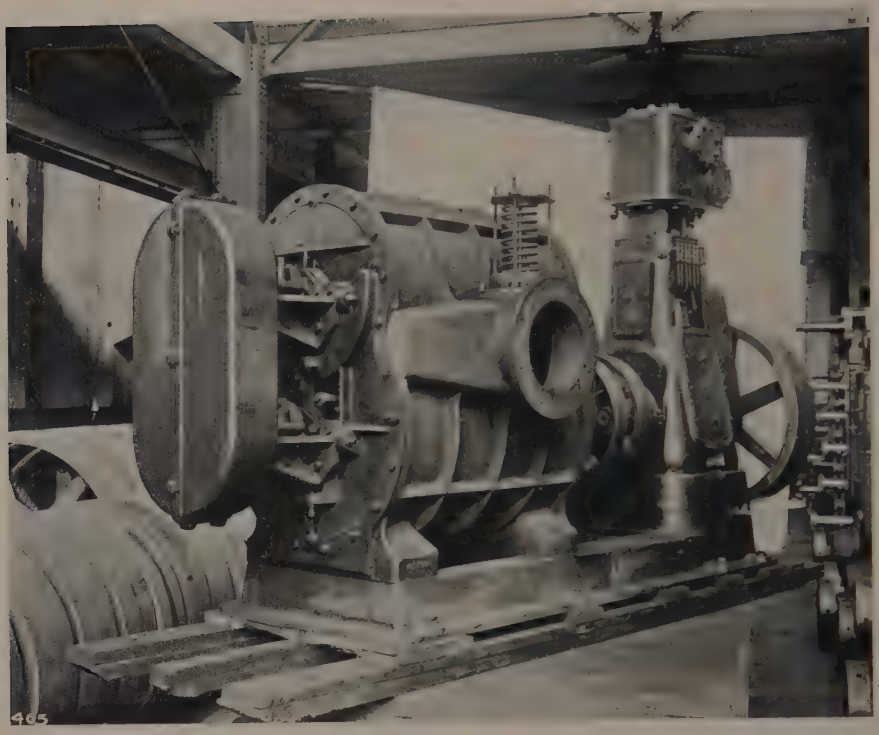

Fig. 26 Courtesy B. F. Sturtevant Co.

Machine Retouching

Cuts of machinery are usually made from retouched photographs which have been treated in a manner similar to that described for shoe retouching. The mask is usually laid over the entire photograph or drawing and one part after another is cut out and modeled up; commencing, as a rule, with the darkest parts in order to give the artist a key to work from, bearing in mind that each part is to be brought out sharp and clear. Tiny parts such as bolt heads, threads, highlights on shafts, etc., are usually finished by hand. The accompanying plates will show how absolutely necessary the air brush is in this work. It would be impossible to lay on the colour by hand with anything like the smoothness that can be attained by the use of the air brush.

Fig. 26 shows the unretouched photograph. (Note the background and poor illumination.)

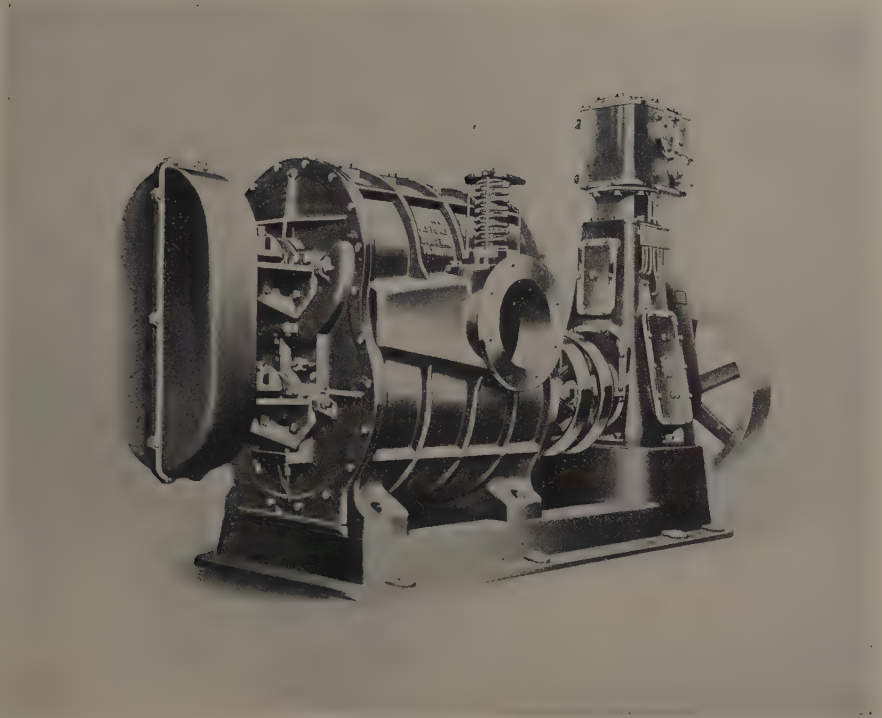

FIG. 27 Courtesy B. F. Sturtevant Co.

Fig. 27 shows the same photograph after it has been worked up with the air brush. (Note the clear-cut and contrasty effects which produce the results wanted.)

Figs. 28 and 29 show a somewhat more complicated commercial photograph, before and after working up.

How Monumental Designs are Made

A sketch is first made in lead pencil very carefully and perfectly. It is necessary that the perspective be rendered correctly. All the detail is carefully shown in outline. As a rule when such drawings are made to order, the pencil sketch has to be approved by the person ordering it. When the drawing is satisfactory it is covered with a piece of frisket paper and is then ready to be worked on. Start at the shadow side of the base, Fig. 30, and by means of a ruler and a sharp pointed knife cut out the lower section. Insert the point of the knife under

Fig. 28. Unretouched Commercial Photograph

one edge of the cut-out area and lift up the frisket paper, removing it entirely. Allow the rubber cement that was under the frisket to dry, which it will do in a minute or two. Rub off the dried cement with the fingers or a piece of art gum, being careful not to destroy the clean edge of the paper. It is necessary to remove all the rubber cement as, unless this is done, when the area is covered with color, the small spots of cement will peel off and leave a clean white spot. The rubber cement is nearly as effective in preventing the color from reaching the paper as the frisket paper. When all is clean, blow in this section carefully with the air brush, being careful to get the values correct and the surface smooth. As for texture, a great variety of textures may be obtained by proper manipulation of the air brush, according to the coarseness of the colour used or the amount of pressure in the tank. Care must be taken that the texture of the whole drawing be the same. A very high pressure, say thirty to forty pounds, will give a fine, close texture.

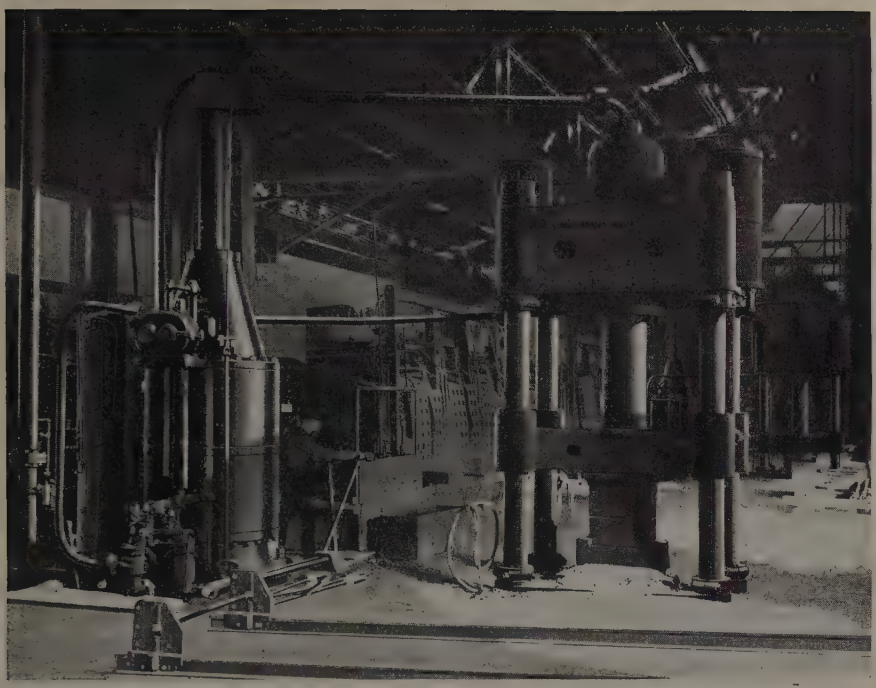

Fig. 29. Same Photograph After Being Worked Over by the Photo-Retoucher

In the illustration the texture is medium coarse. After this section is done, work in the front of the sketch similarly to the part already done, following the same method. Work right on up the sketch in the same way. Where the edge is rounded, do not cut off the frisket paper at the rounded edge, but bend it up evenly, holding the bent back part with the fingers of the left hand or a dab of rubber cement. When the air brush blows against the curved over part it makes a soft edge, giving a rounded effect as shown in the illustration. The very narrow light strips are made by leaving the frisket paper adhering to the drawing and working right over it, pulling off the narrow strip when finished, thus leaving a white strip. After removing the cement from this strip, the air brush can be used to tint it slightly. Another method of obtaining a rounded edge is, after cleaning off the cement, to hold the edge of a thick card mask where the edge is to be and the air brush will give a soft edge. The letters are made in this way: The space where the letters

are to be drawn is blown in evenly, paying no attention to the letters, the piece of frisket paper is laid back on the space whence it was taken and rubbed down again. Cut out the dark flat part of the letters and blow them in. The shadow line is drawn in with a brush. The reflected light appears to be lighter than the rest of the space but it is not. Being surrounded by darker parts, it appears by optical illusion, to be lighter, when in reality it is just the same as the rest of the space. The tops of the letters are lightened by the use of a little white. The ornaments at the corners are cut out carefully so as to leave a flat white section outlined. This section is left untouched until the rest of the drawing is completed and then the shadows are drawn in with a brush. The ornamental border is drawn in after the edge is modelled with the air brush. The grass of course is extremely conventional. Sometimes it is drawn or worked in in green. After the whole sketch is completed, the frisket paper remaining may be removed and the drawing cleaned with art gum. It is best to finish a drawing at one sitting if possible, as on some drawing papers, the rubber cement may leave a yellow stain. The use of a good grade of bristol or water colour board will prevent this. There is a good field for monumental draughtsmen and they receive good pay. They must be accurate and painstaking, and willing to make changes in the original sketches, as persons ordering monuments are apt to be extremely particular. Monuments last a long time, and they must be done according to the purchaser's desires. Draughtsmen in this line usually are employed by granite cutting firms. An artist competent to do either shoes or machinery will have no trouble in doing monumental designs. The whole secret in any air brush work is to get the original drawing correct before attempting any masking. It is extremely difficult to make changes in the drawing except by the use of opaque (black and white) water colour, and of course this gives a radically different texture compared with the work done with the black alone. By using rather thin ink and an extremely low air pressure a perfect stone texture may be obtained. These drawings are usually

Fig. 30. Monumental Design Made with the Air Brush

made about 10 inches wide. They are not as a rule reproduced, but the original drawing is shown to the customer although some firms make photographs of the designs and submit them as specimens. The illustration shows about the average sort of drawing expected, but at times extremely elaborate work is required, such as columns and even statues with elaborate ornaments.

An artist with original ideas which are dignified, chaste and symmetrical may always find plenty of lucrative business in monumental designing. The lettering and ornamentation must also be dignified and appropriate.

CHAPTER NINE

SHOW CARDS

Signwriting has been revolutionized since the use of the air brush has become general. Merchants will pay almost any price for signs that are novel and attractive, and a great deal of ingenuity has been shown by artistically inclined signwriters. We will not touch technically on the show card trade, for there are several excellent text books on the market, which treat this subject very thoroughly. We will say to the readers of this book that show card writers have found the air brush indispensable to them since its advent.

Show cards have been in use for over a century and gradually the merchant has begun to realize that publicity given to merchandise in his windows materially increases his business. The concerns employing show card writers realizing this have begun to offer them extra inducements to enliven their displays, and this means more money for the show card writer. In order to further his own interests he therefore feels in duty bound to offer new ideas and more attractive work to his employer, and as a means to this end he makes use of the air brush.

A few years ago the average card writer was only expected to turn out a neat, plain card. Today his work must not simply be neat; it must be attractive and artistic. The air brush makes it so, provided the show card writer is able to get out of this valuable tool all that the manufacturer intended him to find in it.

A small card sign ordinarily attracting little or no attention, might by the addition of a few seconds' work with the air brush, be made an attractive and forcible feature in advertising. The air brush will work with equal advantage on the finest card or the cheapest paper. There has been many a damaged card thrown away at a loss when it could have been made serviceable in a few seconds by covering the damaged part with some artistic design or figure with the aid of the air brush. When cards are to be duplicated in large quantities, the time spent on each individual card need be very slight.

The show card writer who is not at present the possessor of an air brush has an incomplete equipment and if he desires to maintain his prestige among this trade as an efficient workman he must supply this need. He should have as a protection to his business at least one good air brush which he can utilize readily at any and all times, and whenever possible should be so equipped that he can work if necessary both in oil and water colours. This will mean two air brushes.

Care should be taken not to try to put on too much colour as this tends to destroy the values in the card. It is better to lay on a light, bright tint. This answers the purpose of livening up the card, has the same value and importance to the rest of the card and also gives the card a neater appearance. Do not hold the air brush too near the work when trying to spray on a colour, as the surface of card writers' boards is generally highly finished and the air pressure would cause the colour to be scattered or run in streaks or uneven lines if too suddenly sprayed on the surface.

A card writer will be well paid for time spent in the study of harmony of colours. It would also be well for him to keep in mind the colour schemes pertaining to the season. Bright greens and delicate blues will be suitable for the spring and summer effects. Warm browns, yellows and reds for fall and winter, delicate lavenders or purples are appropriate for Easter, brilliant reds for July Fourth. We suggest yellows and browns for Thanksgiving cards. A card in which the colour harmonies are perfect will attract attention and hold the eye even though the onlooker is unconscious of the reason, in much the same manner as a picture painted by an experienced artist will please the observer.

The holidays such as Easter and Christmas bring forth really artistic efforts and their novelty in colour and design results in good advertising value for the merchant. Every moving picture house and department store, as well as most of the smaller stores, are profitable customers for the show card writer who uses the air brush. Colour results and combinations of course cannot be illustrated here, but some illustrations of

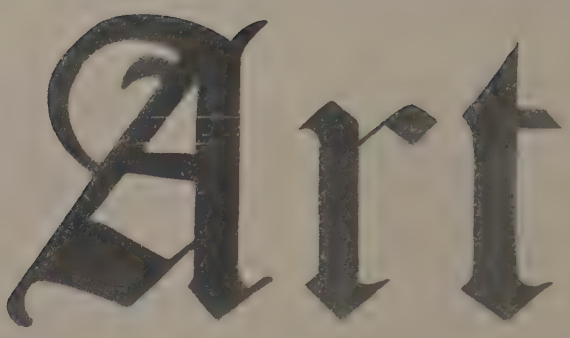

Fig. 31

black and white, shading and modelling of letters are possible. Fig. 31 shows a plain flat letter done with a single cutout. The mask for this may be held down to the card with pins, weights, or rubber cement. Fig. 32 is an illustration of the same letters with the air brush cast shadow. Notice how it lifts up the letters. When this shadow is done in blue or purple it tends to give a still greater effect. Fig. 33 shows the letters modelled. This is a favourite style of lettering with the merchant, as is also the one illustrated in Fig. 34 when done in contrasting colours, in an artistic design, with flowers and other decorations, the re-

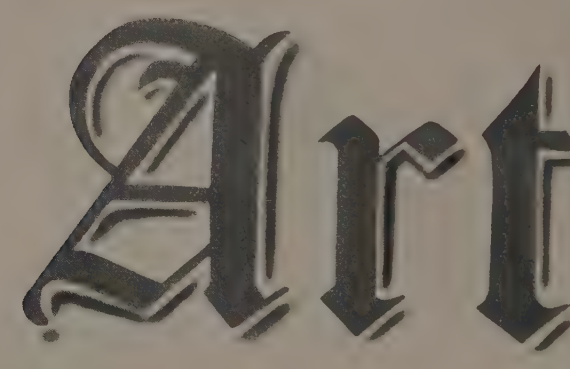

Fig. 32

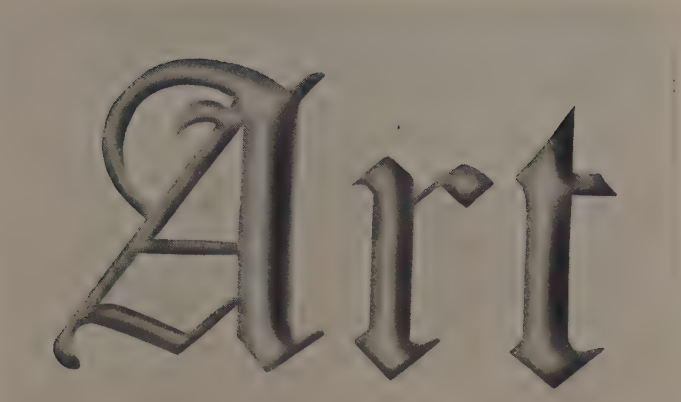

Fig. 33

sults are very attractive. They please the merchant, and draw attention to his goods. Imagine this letter in delicate blue or pink or yellow with a sepia, dark brown or purple shadow. When hung in a window, a card made in this way will have wonderful advertising value. There is no limit to the possibilities in this style of work. Flowers cut out and sprayed in this manner may be given an appearance of actuality that is wonderful. A good, quick, artistic effect may be made in this manner. Draw lightly the letters desired and blow around them

Fig. 34

in a manner similar to Fig. 34. It will not matter in the least if the colour goes over the letters. When the shadow is finished in some suitable colour, such as brown or purple, paint in the letters in white. When dry, model up the letters as in Fig. 34 and the result will be fine. Flowers, leaves and other ornaments may be done in the same way.

The Use of the Air Brush in the Frame Shop

The average proprietor of a frame shop or art store has almost no idea of the great value an air brush or sprayer outfit would be to him. Considering the outlay in first cost, there is no tool used in such places of business that will pay better. As for the cost of maintenance and running, no tool but the hammer can be used at less expense.

A complete outfit can be bought for thirty dollars up, varying according to the kind of outfit needed.

If a foot pump is used to obtain the compressed air required to operate the brush or sprayer, there is really no running expense. If a tank of carbonic acid gas is used, the cost should not exceed one dollar a month; and where larger outfits are used, and electric compressors installed, the bill for electricity will be not over one dollar a month.

The expense for gold, bronze, lacquers, varnish, water-colours, etc., will depend upon the amount of work done, but the cost of such materials is almost negligible compared with the value of the finished product.

As for repairs, the cost will be governed altogether by the care given the outfit. "Cleanliness is next to godliness," but be assured that in the case of this money-making outfit, care is far *ahead* of godliness.

The variety of uses to which the air brush can be put is great. For instance, a customer may bring in a frame to be regilded or patched up. Of course, it must first be repaired and made ready. After cleaning and dusting thoroughly, which can be done better with compressed air by means of the air brush than anything else, apply the kind of powder chosen. It must first

be mixed with bronzing liquid to about the consistency of thin cream. The use of an agitator is advised. This is a device that is placed in the receptacle that holds the mixture, attached to the air brush, and is intended to keep the liquid stirred by means of a tiny jet of compressed air which comes out in the bottom of the cup. The constant bubbling of the air keeps the mixture well stirred, so that when it issues from the air brush it is properly mixed. This is an improvement over stirring when applying gold by the hand brush.

One of the greatest difficulties in properly refinishing a frame is to get the pigment on evenly, without showing streaks and joints.

From the very nature of the thing, it is impossible for any streaks to show when the air brush has been used. Aside from that, it takes only a fraction of the amount of powder that would be necessary for a hand job; and no comment need be made on the marvelous smoothness with which the powder can be applied to the surface to be gilded, and the speed with which the work can be done.

By using powder of the proper colour, an antique frame can be finished in a beautiful style by going over the whole frame first with the darker bronze mixture, and then, holding the air brush almost horizontal with the flat of the frame, bronzing the high spots with the lighter bronze.

In varnishing a painting, both the painting and the varnish should be slightly warm; otherwise a " bloom " or " fog " will form between the surface of the painting and the varnish, and this can be done away with only by taking off the varnish. Any kind of varnish may be applied with an air brush that is adapted to this work.

Do not attempt to run too thick a liquid through the brush, as it is apt to clog it up. For the smaller sprayers and air brushes, the liquid should be of about the consistency of ink. Larger sizes of sprayers will safely take care of liquid that is somewhat thicker.

Mat-boards can be gilded or coloured to match any frame. It has been impossible, heretofore, to obtain mats which are

suitable to each and every kind and colour of frame or picture; but now, with an air brush outfit, a frame can be made to match almost any colour in existence.

To make a mat with a gold line around the opening, cut a mat with a slightly larger opening, place this over the mat to be gilded, and spray on the gold. Be careful to have the mat which is being used for a mask pressed down tightly, so the edge of the gold stripe will be clear and sharp.

White mats may be tinted any colour to match any wood or gold frame, by selecting the right colours or mixing them.

Sepia, Vandyke brown, or burnt umber will match almost any brown frame. Add yellow ochre or raw sienna for lighter colours, such as oak. By experimenting a little and by studying colour charts, one can in a short time become proficient in selecting the right colours.

Antique frames are made in various sizes and shapes, but very often photographs are brought in to be framed, for which no frame can be found to fit the tinted background. It is quite difficult to colour by hand the background farther out to match the frame, but with the air brush it can be done so that it is impossible to detect the joining.

For dusting carton pierre, or other elaborate patterns of moulding, there is nothing which can take the place of a good strong jet of air from an air brush or sprayer. Delicate mats, water colours, etc., can be dusted without any danger of soiling.

Damage done to Venetian photographs can be repaired in fine style, and by a person with but slight experience. The smooth blue skies on these prints have exasperated art dealers and framers ever since they have been sold in this country.

To repair a spot on such a sky, which, with the perversity of inanimate objects is where they usually occur, make up in water-colour a mixture of ultramarine blue (the colour most often used by the original colourist) and white. Put this in the brush and test it on a separate sheet until you obtain the exact shade of the part of the sky which is damaged, then blow the mixture on and cover the spot, being careful to allow it to dry as you work. The colour always appears slightly darker

while wet, and a test made on another sheet of paper is a great help.

If the proprietor of an art store has a little taste or has an employee who will put a little time and patience into learning how to colour photographs, many a dollar can be made by tinting and colouring. There is nothing very difficult about it; a little application is all that is required.

One should avoid using too much colour, for a print with too little colour is much more attractive than one overcoloured.

As soon as customers know they can get enlargements coloured at reasonable prices, and they are pleased with the work, they will gladly bring in their summer photographs. A nicely coloured enlargement, made from one's own film, of some well known spot which brings pleasant recollections, is far more company in a home, than a view of some place that no one in the family knows anything about.

People will bring in, year after year, the products of the summer's vacation in photography. A little exhibit in the window early in the fall will start the ball rolling, and after the colouring is done, there is an opportunity to sell a frame.

Bromide enlargements are difficult to colour by hand, on account of the greasiness of the surface, but with the air brush there are no difficulties whatever in making the colour adhere or flow evenly.

A sky may be put in perfectly smoothly and evenly with no streaks or marks. Clouds can be made with masks, leaving the clouds white and then tinting them slightly with yellow or pink.

CHAPTER TEN

STENCILS — THEIR VALUE; HOW TO MAKE AND USE THEM

The value of stencils depends wholly upon the way they are used. Free-hand work costs money. Stencils make it possible to duplicate the original as often as one wishes, and by their use one is able to reproduce a hundred copies in about the same length of time as is required to produce a duplicate of the original by free-hand.

A specially prepared paper for making stencils can be procured in all art material stores. This paper should be rather heavy and stiff, not too thick, for thick stock is hard to cut. It should be previously treated with an oily substance or preparation. This keeps the colour from being absorbed into the stencil which would make it flimsy and unfit to use.

If stencil paper is not easily procured, take a light but stiff card board and coat it with shellac. This will answer practically all purposes.

First draw the design on the board, then with a good sharp knife cut out the stencil.

Place the stencil over the surface to be worked on, and blow a light tint, at first, increasing the colour in places where shadows will be needed.

For two-colour work a duplicate stencil will be required, in fact a separate stencil is needed for every colour used. Sharp, strong shadows also require a separate stencil.

CHAPTER ELEVEN

VARIOUS OTHER USES FOR THE AIR BRUSH

The uses of the air brush are almost unlimited.

By a perusal of the following list it will be seen that there are still a number of lines of business to which the air brush may be adapted, as follows:

ARTISTS — Commercial retouching, magazine covers, heraldry, colouring of prints, engravings, etchings, etc., portraits, miniatures, artificial flowers.

ARCHITECTS — Colouring maps, bird's-eye views.

BOOK BINDING — Tinting, varnishing.

CHINA DECORATORS — Backgrounds, designs.

CAMPAIGN BUTTONS — Tinting.

DECORATORS — Interiors, mural and otherwise.

DYERS — For applying dyes to fabric without affecting the rest of the cloth.

ENGRAVERS.

ENAMELING — Wood or iron products.

FANCY GOODS — Tinting or spraying on designs.

FEATHERS — Tinting or dyeing.

FANS — Tinting or dyeing.

FRAME MAKERS — Staining moulding, gilding frames, colouring or gilding mats.

JEWELRY MANUFACTURERS — Tinting, lacquering.

LEATHER — Dyeing, enameling, gilding, finishing.

LACES — Colouring.

MINIATURES.

PICTURE MATS.

PHOTO COLOURING.

PORTRAIT FINISHING.

PARCHMENT SHADES.

SLIPPERS.

TOYS.

VASES AND POTTERY.

We have elsewhere referred to the use of the air brush for retouching commercial photographs and for colouring portraits and landscape photographs, but this does not by any means exhaust the possibilities of its use by photographers. It can be used to match up uneven portions of prints. Sometimes white draperies in a portrait may be too light in tone or may be entirely lacking in detail and gradation. It is a simple matter to brush on a little black or sepia, matching the colour of the print. In pictorial work the air brush will be found very useful in improving skies, giving variety of tone and detail to uninteresting masses, darkening parts that are too light, and so on. It is better, of course, to do such work as this, whenever possible, on the enlarged negative rather than on the print, or, better still, on an enlarged positive, for it requires considerable practice to work on a negative successfully. A certain amount of work in the nature of local intensification may be done with the air brush with greater ease and less risk of damaging the negative than when using chemicals. Yellow or red dyes may be brushed on to the film side or the glass side of the negative, preferably the latter, or the work may be done on a separate piece of flat film or celluloid which is used as a screen in front of the negative while printing. Both glass or celluloid must be perfectly clean before doing any air brush work. Glass may be cleaned with strong soda or ammonia water solution applied with a soft rag or a tuft of cotton. Any spots of emulsion must first be scraped off with a knife blade. The glass must not only be perfectly clean but it should be kept warm while being worked on so that the colour spray will dry as soon as it is applied and will not run or form streaks. If the work is not satisfactory, it can be cleaned off very easily. If the air brush work is applied directly to the film side of the negative, the film should first be cleaned with a tuft of cotton wetted with alcohol to remove any grease. Of course this would also remove retouching dope and any retouching that might have been done. The best method is to use a separate piece of celluloid which should be wiped with alcohol to ensure a surface that will not repel the colour. Ground-glass varnish makes a good base to work on. It should be very care-

fully applied to form a thin, even coating. If mistakes are made when using ground-glass varnish, the varnish may be scraped off or rubbed down with an eraser. The colours that are best for negative work are transparent yellow, orange and red according to the degree of opacity required. Finely ground "Photopake" may be used, or draughtsman's India ink. Plenty of reflected light should be used behind the retouching desk, so regulated that the delicate half tones can easily be seen. The ingenuity of each worker will suggest the shapes of masks to be used and the means of holding them in place. The brush should be set for a line and the air pressure should not be more than fifteen or twenty pounds, as this tends to give better control of the colour. The holding back of portions that print too quickly is a very simple matter. Practical experience can be the only guide to more difficult work.

We shall later touch on the subject of backgrounds in a portrait and give examples of air brush work on the print, but with a little practice a background of definite design can be worked into a portrait negative that has a transparent ground behind the figure. This sort of thing was very extensively and very skilfully done some years ago, and still is done to a very considerable extent, by hand, the artist working on a ground-glass surface with pencils, stomps and powdered crayon. To do this well demands a knowledge of perspective and considerable skill and patience. The tendency at the present time is to suggest a background rather than draw in actual objects such as pillars, curtains, windows, trees and landscape views and such suggestions of form and design can be very easily and very pleasingly worked in with the air brush. A few masks and stencils will be needed and they can be quite readily improvised to suit the particular negative.

Three examples of clouds blown in with the aid of a cloud mask, Fig. 35, are shown. (Figs. 36–38.) These are of especial value to landscape photographers, and although they are conventional to a great extent, they are infinitely better than a broad expanse of bald white sky. An additional value lies in the fact that they may be used to hide stains and other defects

that would otherwise make a print useless. With a little practice clouds may be put in that are a great help to the prints. Of course, nature herself is the supreme artist, and her works are hard to imitate. However, by the use of a mask similar to the one shown, fairly good results may be obtained. Keep the spray at a slight distance from the edge of the mask, and keep the mask a very slight distance from the paper. If the mask moves slightly during the spraying no harm will be done. An eraser may be used to good advantage when the clouds are not exactly as intended. A little shadow blown in under the clouds tends to lift them up and give them depth. Practise these examples on white paper before trying them out on photographs. If the results are not as desired, put the prints in the washing tank and wash off the lampblack and try again.

Another field of usefulness for the air brush is in coating papers for gum-bichromate printing. The advantages of using it for this purpose are obvious. The spray dries almost at once so that the paper may be used without any long waiting. The coating will be more even and uniform than any that can be applied with a brush and it has been found that with papers coated in this way, the pigment on the unexposed portions will wash out more readily. For multiple gum prints, air brush coating is particularly adaptable; the repeated coatings can be given in a much shorter time and there is far less stretching and shrinking of the paper. By the air brush method it is possible to coat very thin papers such as onion skin or Japanese tissues without any trouble due to creases, wrinkles and such difficulties that are practically unavoidable when coating by hand.

This is not by any means a new idea. The use of an air brush for this purpose dates back to 1885 when the veteran photographer, W. H. Sherman, patented a method of producing photographs in permanent pigments in which the pigment mixture was blown " upon the paper to be coated by means of a physician's atomizer operated by a continuous stream of compressed air supplied from an air pump, or it may be applied by means of an air brush." As the earliest form of air brush was

Fig. 35

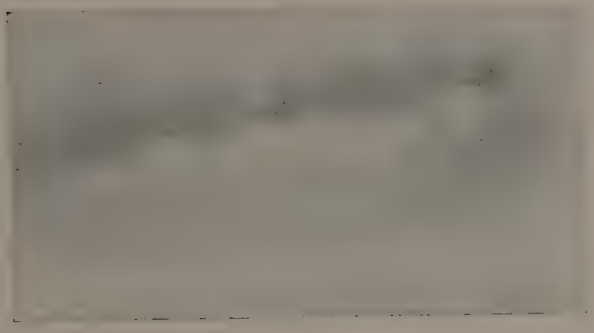

Fig. 36

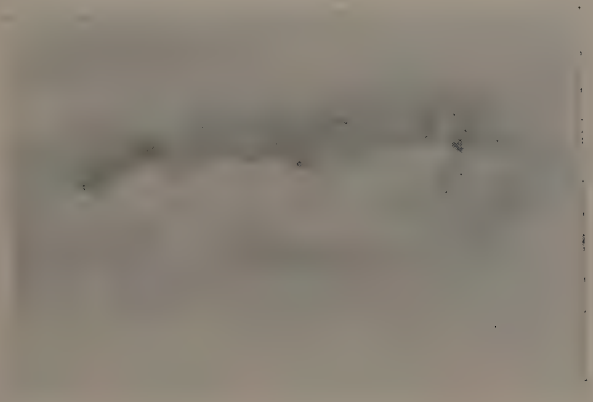

Fig. 37

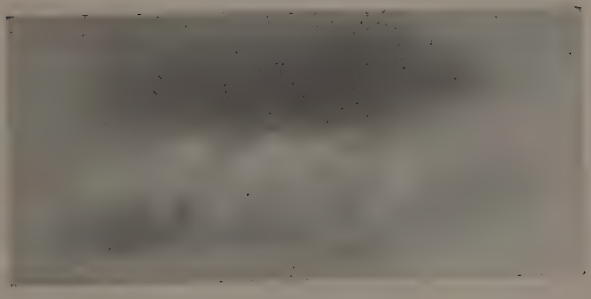

Fig. 38

patented by Walkup in 1885, it did not take Mr. Sherman very long to visualize its application to pigment printing.

Its use by architects for colouring maps, plans and drawings of buildings, its uses in book binding, china painting, dyeing and the other branches of industry mentioned in the list at the beginning of this chapter do not call for detailed instructions nor do such properly belong in a treatise of this kind. We must remember that the air brush is a tool of wide applicability and the ingenuity of the individual must be relied upon to make it adaptable for special purposes.

CHAPTER TWELVE

THE SPRAY GUN AND ITS ADVANTAGES

After the air brush had been in use for some time, certain users found need for a larger instrument, one that would throw more and heavier colour. The manufacturers then produced the Model B air brush, one distributing about three times the amount of colour distributed by the small or Model A size. After a while there was found need for a still larger size, and the sprayer or spray gun, so called, was brought forth. This outfit was made to spray heavy oil paint, varnish, lacquer, whitewash, calcimine, etc. In recent years paint makers have produced a paint or lacquer with a pyroxyline base. This product is a sort of liquid celluloid, and it is very difficult to apply it by hand on account of its quick drying characteristics. The sprayer was found ideal for the application of this new paint. The results were wonderful. The coating was like glass. Its wearing qualities proved much better than that of enamel, and by means of the sprayer one man could accomplish, in the same time, the amount of work done by five. Great savings in the cost of production have been made. The cost of painting automobiles has been cut to about one fifth that of the hand brush method; and the results have been unequaled. An auto can be painted and delivered in twenty-four hours. By the hand method it took from two to three weeks, and even then the results were never so good; the surface was not so perfect, so hard, nor so lasting.

Of course the spraying outfit costs considerably more than the hand brush outfit. But these days are days of progress. First costs are not considered by the manufacturer so much as production costs, and production costs with the sprayer are away below those of the hand method.

The sprayer outfit consists of a spray gun or enlarged air brush, an air compressor, fitted with an air strainer, a water strainer, automatic pressure regulator, an electric motor belted to an air pump, a tested tank, tubing, etc., usually all mounted on wheels to facilitate ease in moving. Spray booths are almost

a necessity for the proper use of the outfit, especially when using the pyroxyline colours. The variety of products coated by the sprayer is constantly growing. The cost of house painting has been greatly reduced. Some doubt has been expressed by old-time painters as to the durability of paint applied by the sprayer. Thorough tests have been made in the following manner. Two sides of a wooden dwelling were painted, the north and east sides. Part of each side done by a first-class painter and part by a sprayer, using the same paint, out of the same can, with the single difference that the paint applied by the sprayer was slightly thinned with turpentine so it would flow through the instrument. At the end of two years it was found that the parts done by the sprayer had a slightly better appearance. It is doubtful if the wearing or protecting qualities are any better, but the somewhat better appearance is probably caused by its greater smoothness and the fact that dust cannot lodge so well on the smooth surface as it can on the surface painted by the hand brush. The sprayer has greatly reduced the costs of painting wicker furniture, the compressed air carrying the coating into the deepest recesses, something not done by the hand brush without much labour and consequently greater costs.

Cellars are whitewashed, cement floors are coated, vessels are painted, leather is made into patent leather by coating with celluloid, leather heels are coated, dresses are tinted. Straw matting takes a design well by means of the sprayer. Any surface needing colour, from jewelry to a factory wall, is now coated with the sprayer. Different pressures are used when spraying with the various paints. A pressure of about sixty pounds is needed to atomize the heavy paints and lacquers, whereas twenty-five pounds will be adequate when using water-colours or the lighter paints. In order to obtain the higher pressures, a larger electric motor is required, whereas, when using the lower pressures, a motor from one half to one horse power will furnish enough power. When house painting is being done, it is usual to have the paint container as a separate vessel holding from one to five gallons. This paint, being under pres-

sure, which forces it through a tube to the hand piece, does away with the pint or quart container attached to the sprayer. The reason for this lies principally in the fact that the colour is used so fast that the operator would lose valuable time in refilling his small container each time it became empty. It is usual to introduce a water and an air strainer between the colour container and the sprayer. The air strainer prevents any air bubbles from being pushed though and becoming a blot on the work, and the water strainer removes any water that may be in the paint. It is surprising how much water will be condensed from the air in a tank under pressure. A drain cock is always placed at the lowest point in order to draw off this water. A drop of water in paint or lacquer might cause considerable trouble.

Interior decorators find it very useful and profitable to include a sprayer outfit in their equipment. There are small portable outfits made which are ideal for their purpose. Being light, they may be moved from room to room and from house to house with little trouble. Blending from one colour to another may be done with a perfection which cannot be approached by the most expert hand painter.

All liquids to be used in a sprayer should be strained through cheesecloth before putting them into the tank. It can easily be seen that a lump of matter that happens to be larger than the small outlet will clog up that outlet.

The sprayer is ideal for coating cracked and checked surfaces. The air pressure forces the paint into the cracks where it would be difficult for the hand brush to push it. Filling up the cracks prevents the wet and moisture from lodging there and freezing. When a heavy coating is desired, one may be put on in one spraying as heavy as is needed.

The use of a sprayer is not hard to master. A beginner with a little instruction may learn to use the outfit in an hour. If the paint is just right and the air pressure is set properly, a beginner may do good work in a very short time. Of course he will waste air and paint, but that tendency will be overcome and he will soon "get the hang of it." The sprayer should be held in such a manner that the colour hits the surface at

right angles. Surfaces that are to be left untouched may be protected from the spray by using a mask made from a card or a sheet of tin. Sprayers must be kept clean. Each day at the end of the working period, the instrument must be thoroughly looked over, wiped, cleaned and oiled, in order to get the best results. A fluid should be used to clean the hand piece, one that will cut or dissolve the sort of paint or varnish that has been used. The day's work should not be considered done until the instrument is thoroughly cleaned. As surely as this is omitted, so surely will time be lost the next day of using. Most sprayers are fitted with a number of nozzles, called spreaders. The different spreaders give different sprays, some flat, some round, according to the wishes of the operator and the sort of work he is doing. With a little attention, the operator will very soon learn the proper spreaders to use for the various sorts of work.

Most sprayers are made of aluminum and that metal, being soft, needs to be protected by being kept well oiled, where there are moving parts. The foregoing holds good also with the pump and motor. The motor runs at high speed and it is dangerous to omit oiling. The pump has one or more pistons which would very soon wear out if not kept well lubricated. If the oil reservoir is kept filled, the bearings are automatically taken care of. The automatic switch takes care of the starting and stopping of the motor, and needs no attention.

Of course there is quite a variety of sprayers. However, the results derived from the various sorts are about the same. It is usually safe to go by what the reputable manufacturer says in relation to his product. Some sprayers, in fact I think all sprayers, are fitted with a vessel attached, or that may be attached, to the under side of the instrument. The colour, being put in the vessel, and the air turned on, the vacuum caused thereby draws up the colour and it is projected through the nozzles onto the surface to be coated. This vessel, which ranges from one half pint to one quart in size, may be detached and a tube attached in its place, which tube, leading from a larger vessel (which may be suspended or not), leads the paint to the

hand piece. When the vessel is suspended, gravity alone is used to draw the colour to the sprayer. When the vessel is on the ground or floor, the paint is usually under air pressure to a moderate degree, which forces the colour to the hand piece, where the pressure from the pump atomizes it and directs it to the surface to be coated. The results are about the same in each case. No matter which method is used, so long as the colour is properly atomized, the results will be as desired.

Two or three coats applied by hand are better than one heavy coat. This applies to coats sprayed on as well. Thin coats dry faster and harder than heavy coats, no matter how applied. Best results are obtained by making the first coat rather flat, that is, without gloss. The second coat will cling to the first coat better when this is the case. If the surface should be glossy, it needs to be rubbed down with pumice, steel wool or fine sandpaper, so as to give a sort of tooth for the next coat to cling to. Otherwise paint will run and refuse to spread properly, no matter how applied. I think it is admitted that a trifle more colour is used to cover a given space by a sprayer than by hand, but this is far and away overbalanced by the saving in time and also in brushes. Good brushes cost money and, especially on old rough work, a brush is soon worn out. The sprayer will never wear out if properly taken care of and new parts may be obtained at slight expense. A competent spray gun operator can cover an average of five thousand square feet in a day. Some fast workers can do more. Of course this means that everything is ready for use, paint on the job, ladders, etc., all ready, scaffold erected, so that the operator's time is not taken up by doing these things.

A man can work in a fairly strong wind without trouble, as the force of the compressed air will carry the paint the full distance to the surface being painted without loss or change of direction. The nozzle of the sprayer is usually held about eight or nine inches from the work and the paint hits the surface before the wind has a chance to deflect it. When working indoors with lacquers, and in fact with most paints, it is advisable to use a mask over the nose and mouth to prevent the fumes from be-

ing inhaled. There is no doubt that such fumes are not beneficial to one's health, but quite the reverse. So why clog the lungs with paint, shellac, or other coatings, when a simple precaution will prevent trouble absolutely. A mask is especially necessary when using the cellulose paints or lacquers.

The spray gun rates very near to the top as a cost saver, and its use is still in its infancy. Any manufacturing concern that coats any article with colour or varnish can make no mistake by installing a sprayer and pumping outfit.

One advantage not to be overlooked is the fact that the sprayer may be used on ceilings and other high places without the help of a ladder. An extension pole is used, one fitted with a trigger and a connecting wire in such a manner that by moving the finger lever at one end of the pole, it opens the air lever on the sprayer which is fastened to the other end of the pole. It is possible to use a pole from eight to twelve feet in length. One can readily see what a great advantage and saving of time and climbing this may be.

There are sprayers manufactured especially for every conceivable sort of work. Any sort of paint desired may be used in its proper sprayer with the maximum of good results. No special mixing or grinding is necessary, with the sole exception that it is extremely desirable to strain the paints before using. This operation takes so little time and saves so much trouble that there really is no excuse for not doing it.

These sprayers are as a rule very rugged and dependable. They are made to stand average handling and are quite simple in construction and have no unnecessary parts. The amount of colour and the shape of the spray are at all times under the control of the user. It is possible to change from a round to a flat spray in most cases by simply turning a nozzle. In other cases the nozzle is instantly removable and replaced by another of the desired shape.

It might happen that, at first, the operator's hand will become somewhat fatigued, but as that is caused by using muscles that are unaccustomed to use, a little practice will soon overcome it.

One good result may come from the more general use of the sprayer and that is, that dwellings and other buildings may be painted oftener than in the past. This should be the result of the lowering of costs caused by the increased output.

One of the most trying things to paint is a shutter. With the sprayer, shutters and lattice work are done and done well in a fraction of the time needed to do them by hand. It is claimed by one manufacturer of spray guns that an experienced spray operator can give the average twelve room, two family wooden house one coat of paint in an eight hour day when the trim is to be the same colour.

In the endeavor to satisfy the needs of nearly everybody, the sprayer manufacturers have brought out a heating unit for the purpose of heating both the air and the paint — or whatever the coating material may be. There are some materials that it is absolutely necessary to heat and keep heated while using, as, for instance, glue, when used as a sizing for gilding, etc., on leather. When using the quick drying cellulose lacquers or pyroziline enamels, it is not absolutely necessary that a dust proof room be used as these materials dry so quickly that no dust has a chance to settle before they are dry. An average clean shop, without unnecessary drafts to stir up dust, will give good results and allow for good ventilation.

The newest and best way of painting traffic lines on streets and highways, danger zones, curve pointers, etc., is to use a sprayer adapted to the purpose. These lines may be painted as fast as a man can walk, the compressor outfit being in a truck and moving along with the operator at the same speed.

One of the peculiarities of the sprayer is this: if you start a spray at one end of a board, it is necessary to keep the spray moving evenly and regularly. If this is not done, if a pause is made or a backward stroke taken, the spot so gone over has received double the amount of covering. This is one of the things an operator must overcome. He must keep the gun moving or else either shut it off or draw it back, unless he wants extra paint to be applied to the same spot. This can readily be understood. The paint is coming all the time and of course

if the machine goes over the same place twice, it is obvious that twice the amount of paint is applied to that spot.

A manufacturer who is not acquainted with the possibilities of the sprayer in his particular line will perhaps have a doubt that there would be any advantage in its use for him. To try to overcome that doubt, a partial list of surfaces which are or may be treated with the sprayer to advantage is given.

Interior decorating of walls and ceilings. Floors. Furniture. Store fixtures. Gas and electric light fixtures. Automobiles. All sorts of machinery. Houses. Photographs. Radios. Radiators. Wicker or reed ware. Picture frame mouldings in every conceivable colour and finish. Railroad cars (freight and passenger). Boats. Dolls. Ladies' dresses, sashes and scarves. Hats. Bridges. Leather cloth made into patent leather. Rugs. Floor mattings in grass and rush. Gold picture mats. Window shades. Jewelry. Electric motors. Wooden toys. Lamp shades. Lamp bases. Tin and glass gift shop articles. All sorts of fabrics. Wall papers originated and tinted, oiled and varnished. All sorts of fabrics coated and hot glue size for applying gold and other shades of bronze in the leaf. Shoes coloured to match dresses.

The list of paints, etc., that may be used in the sprayer for coating the above named articles and surfaces embraces:

House paints. Enamels. Varnishes. Shellacs. Duco and other cellulose and pyroxiline paints and lacquers. Water-colours. Glues. Spirit and water stains. Sizes.

The mixing of these liquids in no way differs from that done by the hand painter, with these two exceptions: first, it is necessary to strain all liquids to be used in the sprayer, and second, they should be somewhat thinner. Of course the higher the pressure in the tank, the thicker the liquid may be.

New uses are found for this wonderful instrument so fast that it is very probable that before this comment is printed, the list will be greatly augmented.

CHAPTER THIRTEEN

A FEW WORDS ON MIXING COLOURS AND TINTS

We feel that a few directions regarding the mixing of colours will not be amiss and will probably be of some help, especially to those who have had little or no experience. A few hours spent in making actual experiments in colour mixing will do more to instruct the artist than weeks of reading. Hence we suggest that some time be spent in trying to mix colours according to the following directions. It is not necessary to have many colours to begin with. In fact the less experience a person has the more apt he is to buy a large variety of colours indiscriminately. Up to a certain point the fewer colours you have, the better work you are apt to do. You become familiar with the colours you have, know just what they will do under all circumstances, and can unhesitatingly use the right one without mistake. It is not possible to have a ready-made colour to fit every requirement, as the infinite gradations of colours in nature are so vast that no box could hold them all and no one could take the time to hunt them up. It is much better to use a comparatively small selection of colours and become perfectly acquainted with their uses and qualities. For air brush work the most convenient form in which to buy colours is either in bottles or jars, and of the two the bottles are certainly the more economical. The colour is in a liquid or paste form and readily dissolves in water. We advise procuring about a dozen wide mouth two ounce bottles. Put about a teaspoonful of paste colour into each bottle. Half fill the bottles with clear water and stir well. The colours should be about the consistency of ink when ready for use. Anybody who uses colours, whether he apply them with a brush or with an air brush, ought to understand something about the nature of colours, their classification and the innumerable possible effects of contrast and harmony. It would take up too much space to go into this fully in a book of this nature, so we will record briefly just a few recognized, important and interesting facts.

The three primary colours are red, yellow and blue. These are termed primary or simple colours because they are the source whence all others are derived by mixture. The combination of any two of these, in equal parts, produces another colour: a colour of another class called a secondary or compound colour. Thus

Red and yellow make orange.
Yellow and blue make green.
Blue and red make purple.

These secondary colours also may be combined to produce a series of varying shades such as russet, olive, etc.

When two primary colours are mixed to produce a secondary colour, this secondary colour is complementary to the remaining primary colour. Thus:

Orange, produced by red and yellow, is complementary to blue.
Green, produced by yellow and blue, is complementary to red.
Purple, produced by blue and red, is complementary to yellow.

This applies also to combinations of secondary colours, the tertiary colour produced by the combination of any two secondaries being complementary to the remaining secondary. Black and white are also regarded as being complementary to each other, and the principle which governs the relations of pure primaries applies also to every variety of tint of those primaries. Contrast comes under two important subdivisions: contrast of colour and contrast of tone. Contrast of colour means that complementary colours placed in juxtaposition mutually enrich each other while colours that are not complementary, when placed side by side, are mutually injured by contrast. Contrast of tone results from placing side by side two tints of the same colour but of different degrees of intensity or depth. All colours gain in depth by contact with white, while black has just the opposite effect.

A little study of the nature of colours will show that it is

possible to change the characteristics of colours by simple juxtaposition; that it is possible to enhance the value of two colours by this juxtaposition, or to enhance one colour at the expense of the other. We have not tried to show why these things are so — that is beyond the scope of this book — we are simply presenting facts.

Colours have certain recognized characteristics that every worker with colours ought to be familiar with: red and yellow and their mixtures are known as warm colours, they also come near the eye and are less impaired by distance than any other colours. On the other hand, blue, and mixtures and tints of which the larger portion is blue, give an idea of coldness and distance. Red is the most positive and exciting of all colours while its complementary, green, is the most soothing.

The smallest practical assortment of colours is black, crimson lake, gamboge, and Prussian blue, and a large variety of tints can be made from these few colours, but there are some tints that cannot be made with this assortment. So we will add vermilion or scarlet lake, also either ultramarine or cobalt; and in addition to these, light red, burnt sienna, yellow ochre or raw sienna and sepia. With these colours you can make with a little practice almost every tint in the rainbow. It is advisable, to save time in mixing, that at least two more tints be mixed ready for use, viz. — a warm and a cold green, using gamboge and Prussian blue for the first and adding ultramarine or cobalt to this mixture for the second.

When painting in water-colours by the ordinary method by hand it is often difficult to change a tint after it is once laid. The under colour is apt to soften when an attempt is made to lay a second wash. This is one of the instances in which the air brush is superior. If, for instance, a sky has been tinted yellow and it is desired to give it a tinge of orange near the horizon, the air brush will colour the yellow just enough and no more by using one of the reds without in the least disturbing the under colour.

To make a beautiful gray for clouds over purple, put a

faint tinge of gamboge. Yellow ochre and Prussian blue make a fine green for foliage. Use gamboge instead of yellow ochre for patches of green where the sun strikes.

Further information regarding colours will be found in the chapters on colouring photographs.

Part II

A PROGRESSIVE SERIES OF LESSONS IN THE USE OF THE AIR BRUSH

By SAMUEL W. FRAZER *and* GEORGE F. STINE

INTRODUCTORY

The following lessons are offered from an actual experience of twenty years of actual use of all kinds of air brushes. The first fifteen lessons are designed to teach the general use and control of the air brush. The subsequent lessons deal with its use as applied to photography and take up in detail the use of the air brush for background work, for working up prints and enlargements and for working up and improving negatives. If the instructions are followed carefully and the lessons thoroughly studied, it is inevitable that the results will be of great benefit to the pupil.

LESSON ONE

LINES

In making this practice sheet (Fig. 39) set the brush so as to give a good even spray when working about half an inch from the easel.

The important part of this sheet is to teach the air brush user to eliminate the dot at the beginning and end of each line. It does not matter how long the lines are made, as long as the dots are eliminated.

The secret of success is simply to start the movement of the brush before the colour and to shut off the air at the end of each stroke before stopping the movement of the brush. This is the way it is done by all air brush workers.

It is not necessary that one should be able to make the line as straight as those shown in the illustration, but the artist will not benefit from this lesson unless he learns to eliminate the dot at the beginning and end of each line. These lines should be made free-hand, using the full swing of the arm. Begin with this lesson to use free arm movement, as this is one of the necessities for successful air brush work in all lines of endeavor.

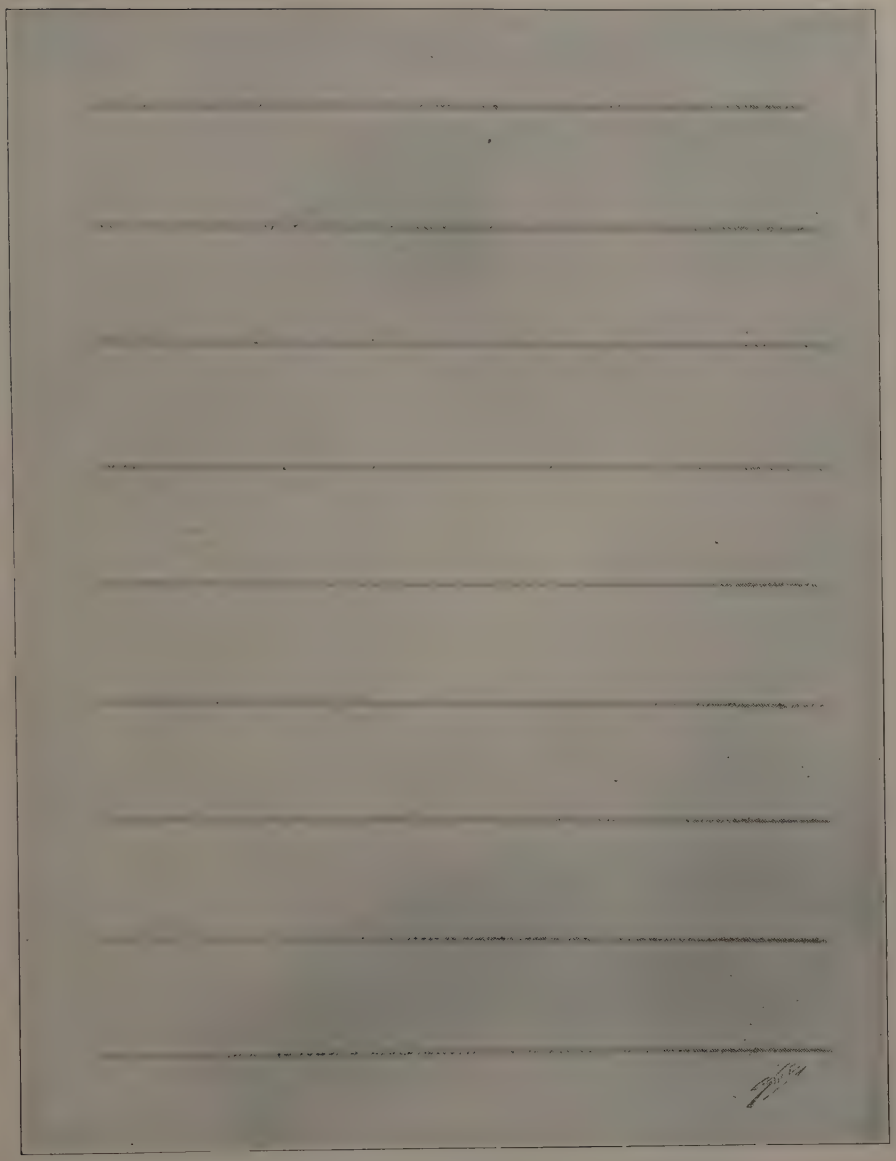

Fig. 39. Lines Must be Made Without Dots at Either End

LINES, VERTICAL AND HORIZONTAL

The instructions for this practice sheet (Fig. 40) are identical with those of Lesson One, that is, the work should be done with free movement and the dot must be eliminated at the beginning and end of each line.

The vertical lines should be made with a vertical movement, not by reversing the sheet on the easel and making them horizontally, as by so doing the student would gain but little in control of the brush. Students often will master horizontal lines in a short time, but not vertical ones, and so one should make this sheet over and over until both horizontal and vertical lines can be made equally well.

It is not necessary to have the lines as straight as those in the illustrations.

Fig. 40. The Vertical Lines Will be Found the Difficult Part of This Lesson

LESSON THREE

CROSS LINES WITH DOTS

First blow in the horizontal lines and then the vertical ones to form a number of squares, using the methods as taught in previous lessons. After the squares are completed, place a dot at the intersection of the horizontal and vertical lines (Fig. 41). To place the dot accurately is one of the finest tests for control in the placing of dots.

This sheet must be mastered thoroughly, as it will be found in almost all later work that the ability to make a dot just in the right place is very often called for, and in order to be able to place dots accurately one must master this practice sheet.

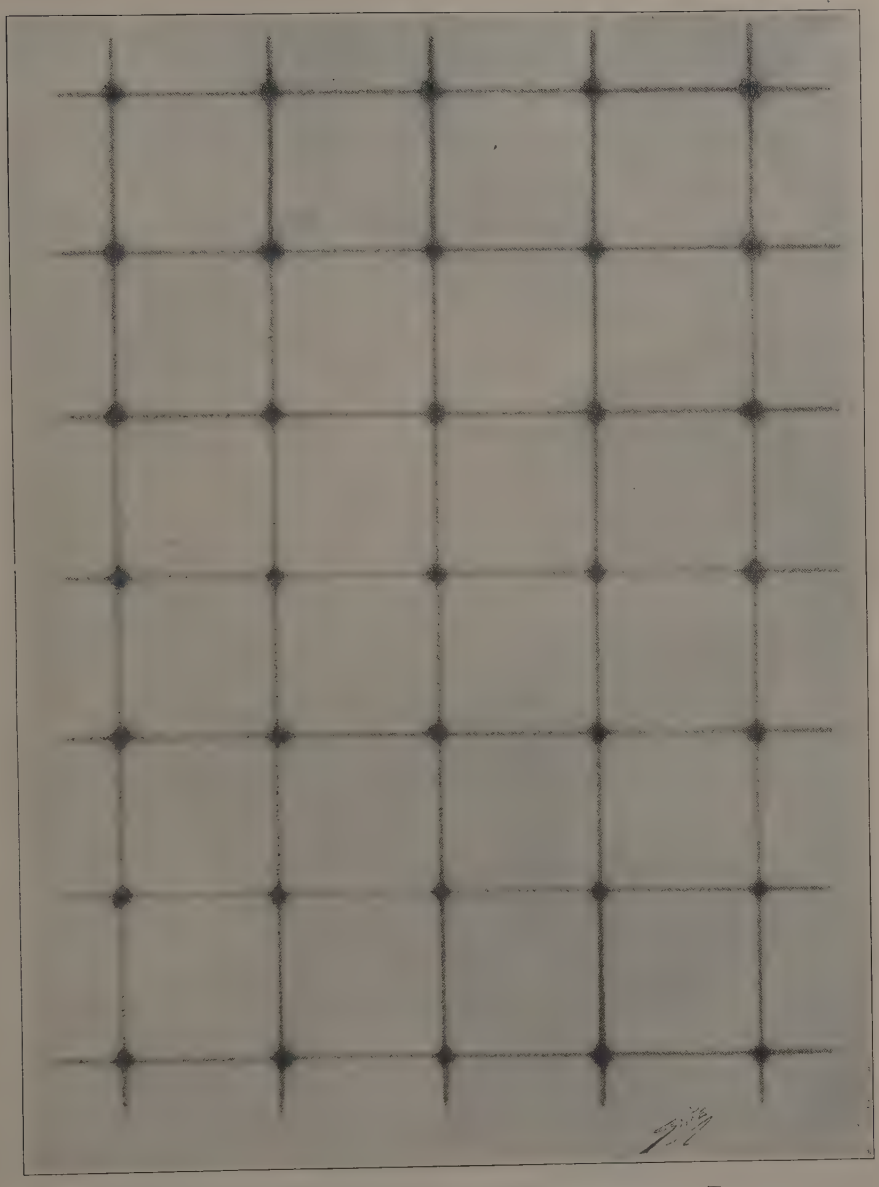

Fig. 41. Obtaining Control in the Placing of Dots

LESSON FOUR

CROSS LINES WITH SEPARATE DOTS

This practice sheet (Fig. 42) should be made equally as well as Lesson Three, omitting the dot at the intersection of each vertical and horizontal line, also remembering that the dot must be eliminated at the beginning and end of each line. After the lines have been made and the squares nicely formed, place a dot as nearly as possible in the center of each square.

Never feel that your work is good enough, but always strive for something better and practice this lesson as well as the others until at least one result is as good as the illustration itself. All these lessons must be made free-hand, using no lines as guides, and using full arm movement. Of course the designs must not be outlined in pencil before using the air brush as if this is done little benefit will be obtained.

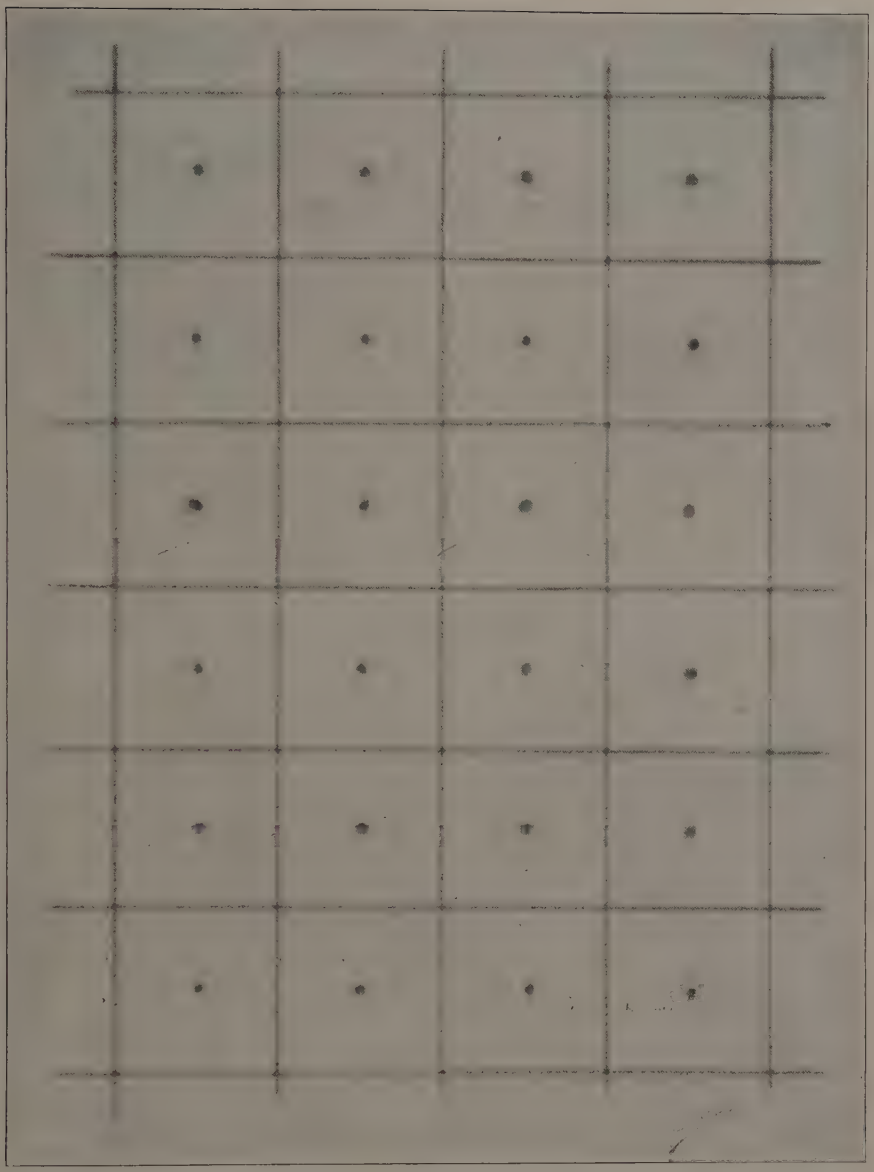

Fig. 42. Here We Have No Intersection of Lines to Guide Us in Placing the Dots, Which Must be Placed as Nearly as Possible in the Center of Each Square

LESSON FIVE

LINES

At first sight this sheet (Fig. 43) might appear to be very simple, but this is not the case, as it is one of the hardest and one of the very best practice sheets known. This lesson is the foundation of all good work with the air brush, as it teaches one practically perfect control, which is very necessary before attempting to work up pictures in black and white or colours.

It is not necessary to try and copy this sheet exactly, but the important thing is to be able to eliminate a dot at the beginning and end of each curve and angular line. At the end of each line allow the pressure on the finger piece to relax, thus shutting off the air. This is to train the finger to allow the air brush to make lines and stop off the colour almost unconsciously. The touch is very similar to that on a piano key. The ability to make good lines is of great importance and no good work can be done without it.

The method for air brushing this sheet is as follows: Hold the brush the same as for all other practice sheets and complete the first vertical line of curves, then the second line of angular lines, etc., being sure that the dot is absolutely eliminated. The sheet should be practiced till it can be made rapidly. This teaches one to work rapidly with all kinds of curves and motions and at the same time have full control of the colour flow. This practice is used continuously when working professionally with the air brush and one must master it to become a proficient workman.

The curves may be of any size or shape, and the lines of any length and angle.

Fig. 43. An Exercise Requiring Careful Practice if One is to Obtain the Control Necessary in Actual Work

LESSON SIX

CIRCLE WITH DOT

Free arm movement is absolutely necessary when making this sheet (Fig. 44). Without it the lesson cannot be successfully carried out. First of all one should get the circular swing of the arm and then it must be remembered that the brush should be started in motion just before the colour and the colour stopped just as the two ends of the line meet. Then, immediately, the brush should be moved and a dot placed in the center of the circle, as in the illustration.

The circles may be of any size, but the circle and dot must be made over and over until one can make the circle and place the dot accurately in the centre very rapidly. It is a good plan when practicing to make the circles of varying sizes.

Fig. 44. In Practising, Make Circles of Varying Sizes

DOTS

Figure 45 would appear at first sight to be a rather difficult design, but upon trial it will be found to be rather simple. In practicing the sheet, first of all make the top horizontal line of dots, then the second, placing the dots between the dots of the line just above, and so on until the triangle is completed.

The triangles must be made free-hand, without any guides or measuring, and there should be at least two on each sheet. The size does not matter, but one should make sheet after sheet until fairly proficient. It is impossible to get too much practice. No matter what kind of work it is proposed to engage in, this lesson will be of great help.

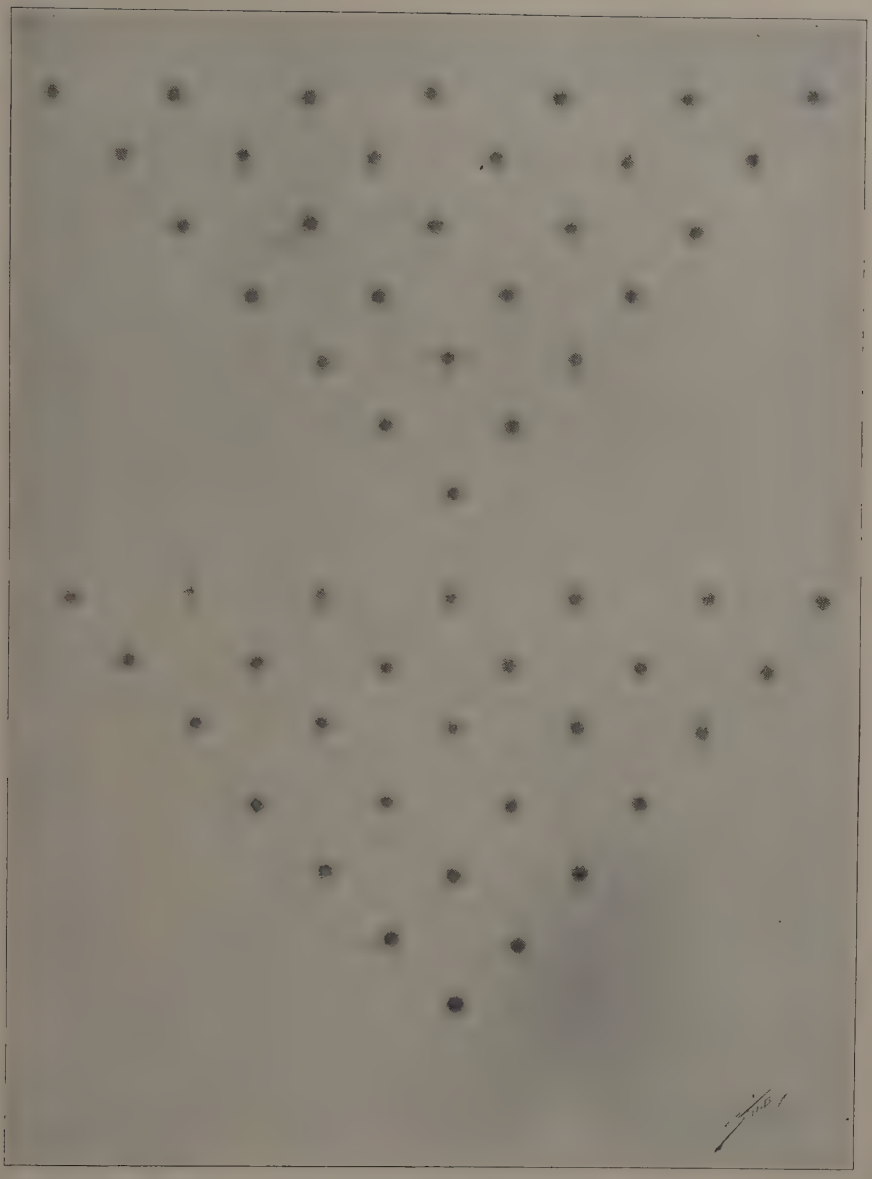

Fig. 45. Endeavour to Place Each Dot Equidistant from the Others

LESSON EIGHT

EVEN TINT

In all previous lessons the brush was used at approximately the same distance from the easel, about half an inch, with the same flow throughout. With this sheet (Fig. 46), however, one should first of all cut out an oblong of about the size shown in the illustration, either from celluloid or a mask chart, and place it on the practice sheet in its proper location and fasten it with pins. The important thing in this lesson is to blow the square in with an absolutely even tint, as shown, trying to make it as smooth and even as a piece of tinted paper. To accomplish this, open the brush to give a good, wide spray and work with a swinging free arm movement, up and down the opening, at an angle of about forty-five degrees across the opening, holding the brush about ten inches from the paper and having the colour flowing only when the brush is in motion. Apply the colour lightly at first, and add colour until the desired depth has been obtained. Make different examples of this sheet, varying the depth of the tint. This is one of the advanced sheets and is a design that is used upon portrait vignettes, so it is a very good practice sheet for the photographer.

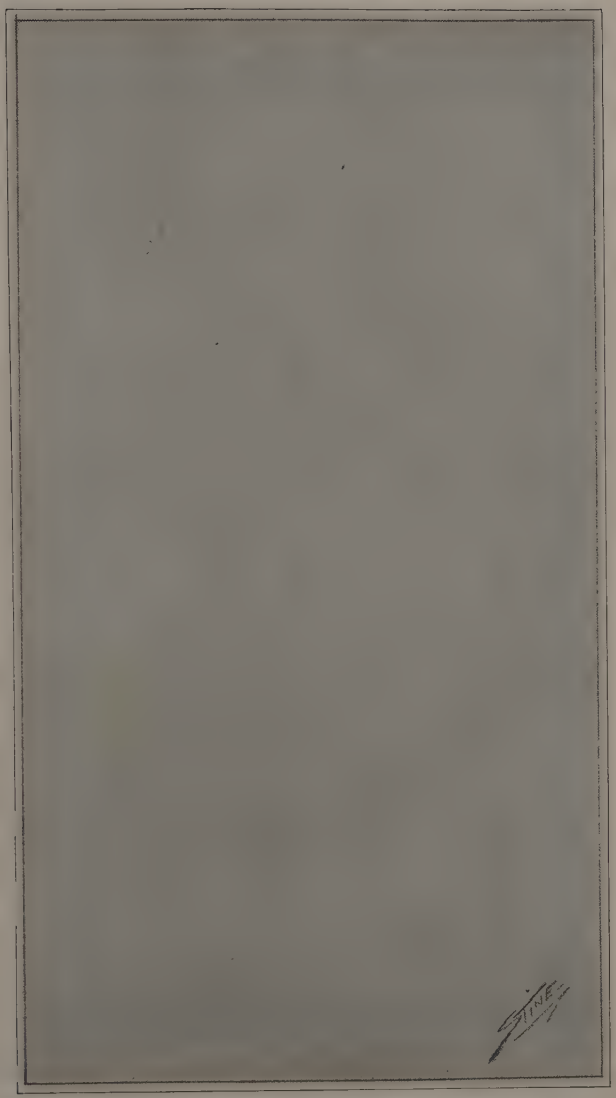

Fig. 46. Different from Preceding Lessons in that the Entire Surface Must be Blown in to One Even Tint

GRADED OBLONG

Cut an oblong mask out of a piece of medium heavy card. Pin the mask to the practice paper and grade it as shown in the plate (Fig. 47), very dark at the top, fading away to almost nothing at the bottom. The grading must be absolutely even, like the blue of the sky from the zenith to the horizon. Work at this until the eye can detect absolutely no unevenness. Do not forget that each stroke must be complete of itself, allowing the finger to relax and the air and colour to stop coming at the end of each stroke. The object is not to tint the paper but to *train the finger* to do its duty instinctively.

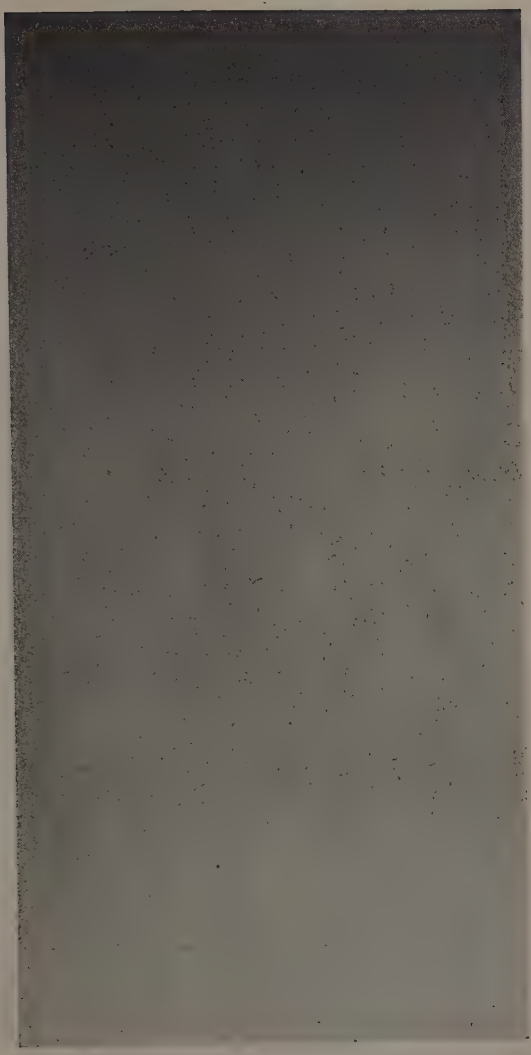

Fig. 47. Graded Oblong

GRADED OBLONG WITH HIGH LIGHT IN THE CENTRE

Work exactly as in the previous lesson, being careful to keep the high light in the centre clean and clear (Fig. 48).

Fig. 48. Graded Oblong with
High Light in Centre

LESSON ELEVEN

THE CUBE

Draw in outline a cube similar to the illustration (Fig. 49). Have the sides of the cube about three inches long. Cut out the largest or darkest side and, using the remainder as a mask, blow in that side smoothly and evenly as nearly like the illustration as possible. Then cut out the narrow side of the cube and put back the part already done to act as a mask. Blow in the narrow side as the lesson shows. Then cut out the top and blow in that part. Do this as carefully as possible so that there will be no lumps or roughness. Make a number of these cubes until you are sure you have done it as well as possible. If you do the best you can on each lesson as you go along, the following lesson will be much easier.

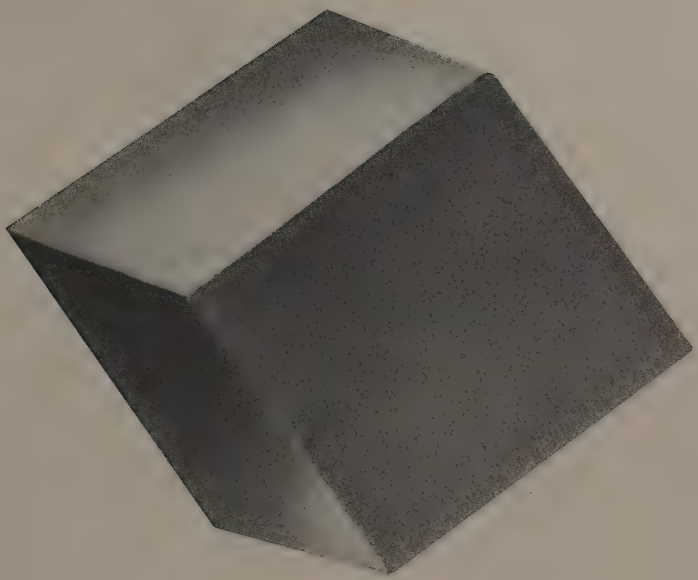

Fig. 49. The Cube

LESSON TWELVE

THE CYLINDER

Cut a mask in the shape of a cylinder, as shown in the plate (Fig. 50), also cut on the line forming the oval at the bottom. Pin the oval in place at the bottom and spray in the cylinder as shown. Then take out the oval and put back the upper portion of the mask and spray in the oval. The body of the cylinder is best made by working lengthwise of the cylinder. Persist until you have made the high light and reflected lights absolutely even and unbroken.

Fig. 50. The Cylinder

THE SPHERE OR BALL

Cut out circles of various sizes. Spray them in as shown in the plate (Fig. 51), making your strokes parallel with the circumference. Persist until you make the ball look round. Get the high lights clean and reflected lights transparent and where they belong. Putting in the shadow underneath helps to suggest roundness. If the outline is a trifle softened, instead of being absolutely sharp, as in the plate, the result will look more like a sphere and less like a graded disk.

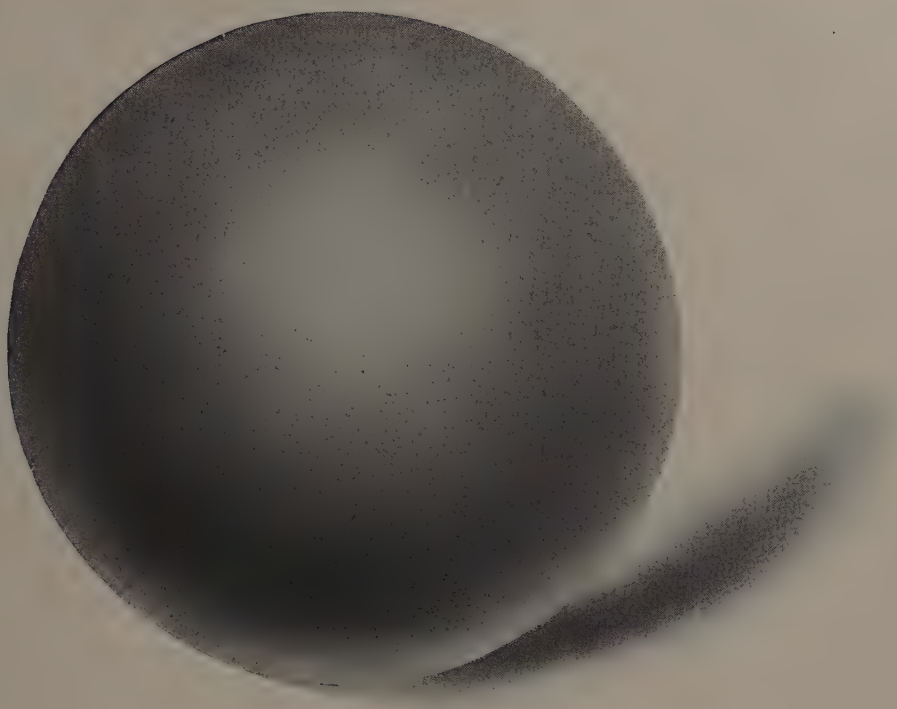

Fig. 51. The Sphere or Ball

LESSON FOURTEEN

FREE-HAND LANDSCAPE IN BLACK AND WHITE

This practically combines all the foregoing lessons. They are the basis of all air brush work. Do not leave any lesson until it is thoroughly mastered. When in doubt go back and do it again. Nothing is lost, but everything is gained, by being thorough, and every one of the effects shown in the lessons is used a thousand times a day in practical work. We give here an illustration that will be a source of much profit if faithfully copied. All kinds of strokes are shown in this example. When you can make a good landscape without any mistakes you can do pretty nearly anything in the line of air brush work. The original of this example (Fig. 52) was drawn and executed entirely with the air brush. The moon was made by means of a mask cut out of a card, thus leaving the moon white and putting the cloud across it afterwards. Try originating sketches, country scenes, flowing streams, boats with lazy reflections in the water, etc.

Fig. 52. Free-hand Landscape in Black and White

A FREE-HAND LANDSCAPE IN COLOUR

Use a good grade of drawing paper, and sketch the picture in lightly with pencil, although this is not really necessary, as the original of this drawing was made with absolutely no preliminary sketch. As this represents a cold winter evening, the clouds should be bluish grey, the light parts faintly tinted with Naples yellow shaded with purple with, around and near the moon, just a few faint touches of pink and blue. The moon is made with a mask and blown in with Naples yellow almost white. Near the horizon the sky is deep greyish purple. The trees and fence are made with a deep brown. The snow will have a faint tint of Naples yellow. The shadows are blue and purple. Bear in mind all through your work on this sketch that you are representing a cold night. In the foreground a few touches of brighter colours on the weeds and leaves will be in order. The cedar in the centre will be a bluish green.

If you have faithfully followed the lessons given, you will find it very easy to make the trees and branches with the air brush. If you should get the shadows too dense at any part, you can open them up by using clear water in your brush and working close, using a fine line. You will find that the water softens the heavy colour, and the air blows it away from the spot, giving a transparent effect, and making a light stroke where it was formerly dense and opaque. On finishing, spray a little gum arabic over the sketch, especially the darker parts. This tends to bring out the true colour of your paints.

Very pretty effects can be gotten by making sketches in one colour, such as deep blue, brown, Indian red and purple.

After the student has mastered these fifteen lessons, he should be able to do any work which the air brush is capable of doing. The following lessons are designed especially for those desiring to use the air brush in connection with photography.

SQUARE CORNER DESIGN

In making this design (Fig. 53) it will be necessary to cut a square of ground celluloid as shown in Fig. 59. Place the square, which must be accurately cut, parallel to the edges of the practice sheet and blow in the colour with a good even spray, holding the brush about four inches from the easel and working the colour across the square at an angle of forty-five degrees, with a full arm movement. The colour should be stronger at the corner of the square and should blend therefrom into nothingness, as shown in the illustration. The success of this design depends upon clean-cut edges and an even application of colour.

It must be remembered that, for all such designs as this, one should work at a distance from the easel, using the spray best suited to the individual worker. Light and shade effects such as this one and those in the following lessons should be studied earnestly, as they mean much to the photographer in the production of handsomely finished portraits.

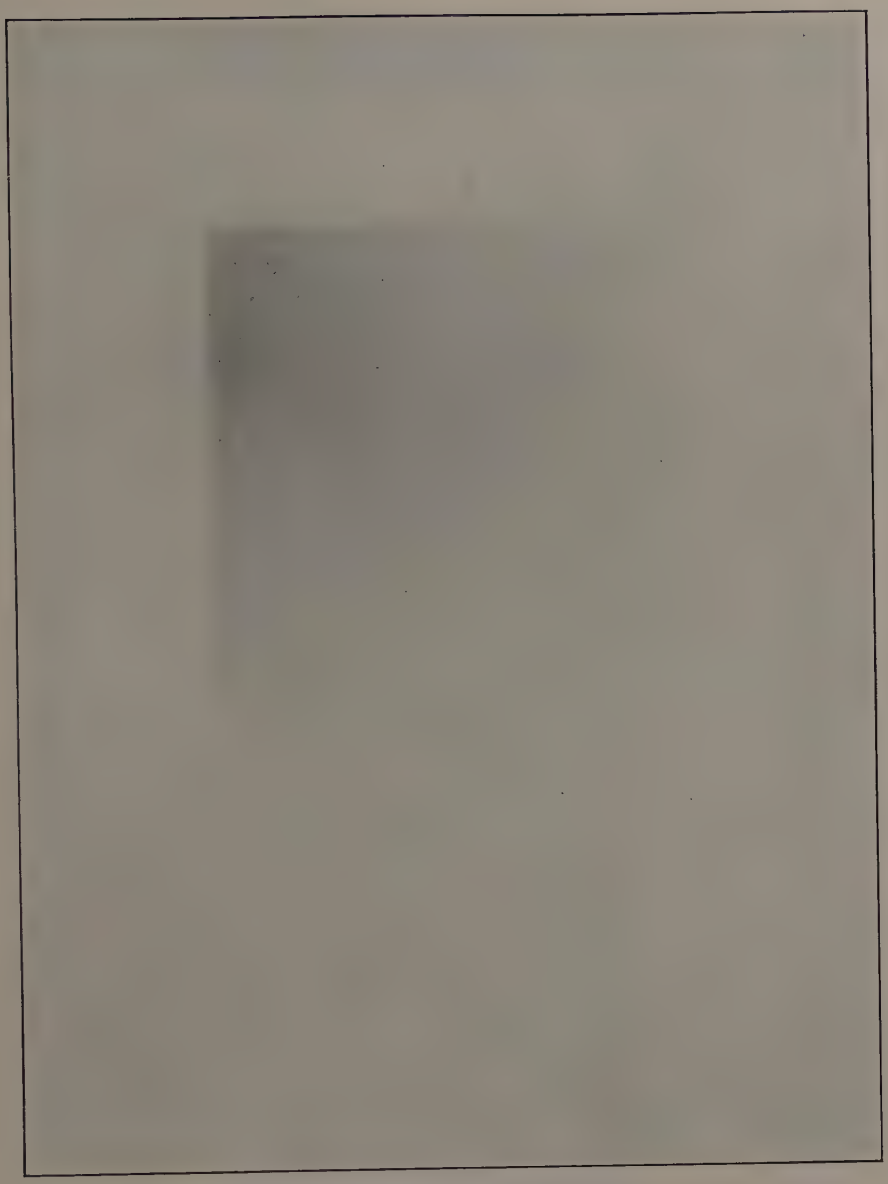

Fig. 53. Square Corner Design

SQUARE CORNER WITH BEVEL EDGE

The instructions given in Lesson Sixteen should be followed in blowing in the inner portion of the square corner shown in Fig. 59. Then the celluloid mask must be moved a little so that it will leave a white border on the top and to the left of the part already blown in. Over this white border blow in a light tint with the same free arm movement used in making the square (Fig. 54). It will be found that when tinting the border, the colour will spread over the rest of the work, but this will not injure it, on the contrary, it will tend to improve the effect.

After the border has been lightly blown in at the top and left side, while still holding the celluloid mask in the same position, cover the top border with a strip of celluloid cut to give the corner angle as shown. Then blow in the left hand border just a trifle darker than the top and the inner square. By the use of these different shades, the effect of perspective is obtained in the bevel edge.

Fig. 54. Square Corner with Bevel Edge

OVAL DESIGN WITH BEVEL EDGE

Take two pieces of celluloid and cut out of each an oval opening, one a little larger than the other, so that by their use the border effect shown in the illustration (Fig. 55) can be obtained. These must be as accurate as possible, and therefore brass forms of known accuracy should be used as guides when cutting them.

Place the smaller oval in perfect contact with the practice sheet and, with a free vertical motion and a good even spray, blow in the design to the required density, working at the distance from the easel that is best suited to the operator and trying to secure uniformity in the tint.

When this part of the design is finished, remove the smaller oval and replace it with the larger one, being sure that the margin is the same width at all points. Give a light wash over the entire design to secure the border effect, after which set the brush to give a medium fine spray and work in the shadow as shown in the illustration by working along the curve of the oval, the brush being used approximately one inch from the paper.

Fig. 55. Oval Design with Bevel Edge

COLUMN OUTLINE

Place the column form cut from celluloid in perfect contact with the paper and with a good spray and free vertical swing, blow in the column outline (Fig. 56), having the colour stronger at the outline and blending therefrom into nothing towards the centre of the column.

The white portion towards the left in the illustration is the part that was protected from the spray by the form cut out of celluloid and temporarily fastened to the practice sheet. As considerable use will be found for this and other celluloid forms throughout the course of these lessons and later on, in actual work, they should be carefully made and handled as they will last a long time and will form a part of one's permanent equipment. Technically, these forms are known as templates.

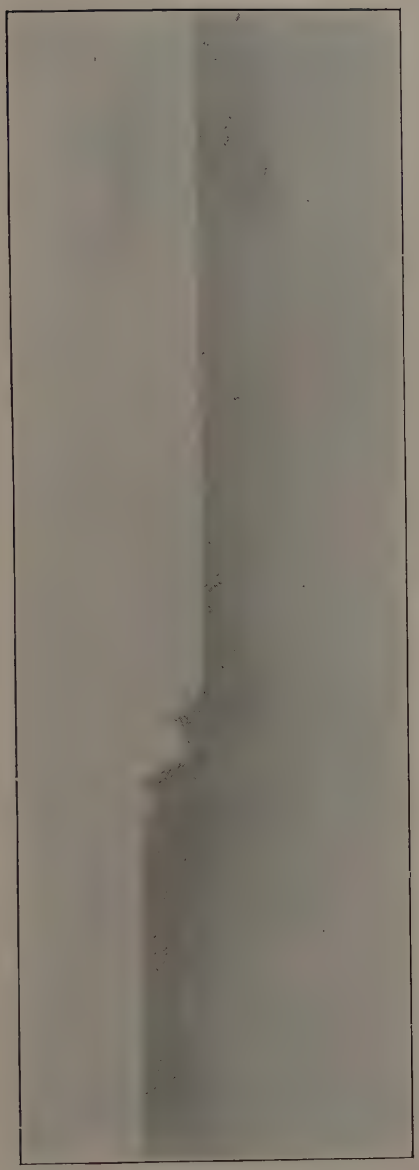

Fig. 56. Column Outline

CLOUDED EFFECT

Sometimes a clean-cut edge in masking is not desired. In Fig. 57 a cloud effect is what should be aimed at, and to obtain this effect a form torn from blotting paper, Fig. 58, will be more satisfactory than one cut out of celluloid. Such a form will not be as permanent as a celluloid one, but, on the other hand, it is easy to make and can at any time be duplicated.

Using a form like this, with a good spray, blow in the clouded outline, having the colour stronger at the edge of the form and fading out gradually as it gets farther away.

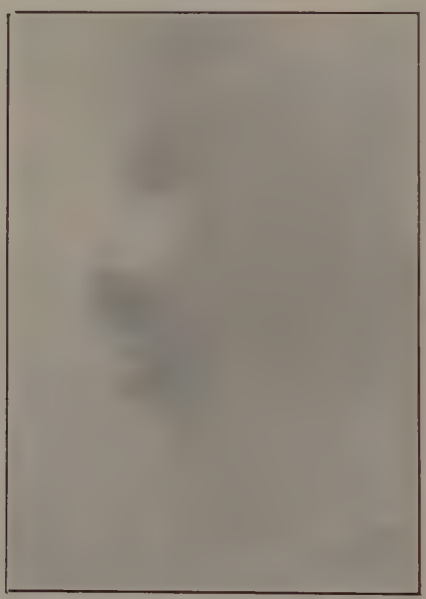

FIG. 57. CLOUDED EFFECT

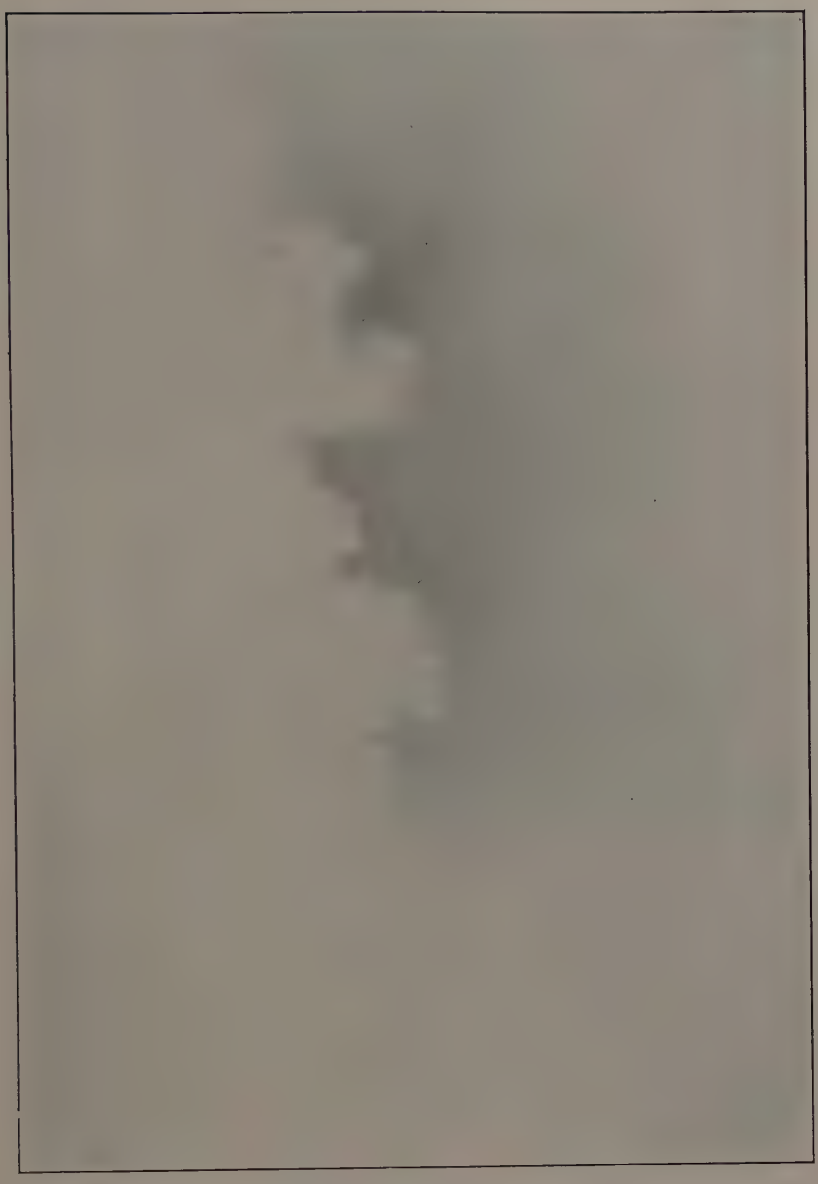

Fig. 58. Clouded Form Template Torn from Sheet of Blotting Paper

LESSON TWENTY ONE

POINTED FORMS

Cut accurately from a sheet of celluloid one of the pointed forms shown in Fig. 59. Place the design upon the practice sheet and blow in the design as shown in Fig. 60, using the spray best suited to the operator. The success in air brushing these clouded or pointed forms depends upon the smoothness with which the colour is applied. Such designs, when finished, must be devoid of all spots. The difference between this and the preceding lesson is that in Lesson Twenty the outline should not be hard and clean-cut, but should be more or less blurred, while in this lesson, the pointed forms must be clear and distinct. These pointed forms will be found very useful in actual work later and this lesson should be practiced until one has a complete familiarity with their use.

This pattern of mask is a very useful one to the photographer. Prints that have a plain, light background may be improved greatly by its use (Fig. 61). The illustrations show how a different effect may be obtained by different placing of the forms. In Fig. 62 the diagonal placing of the form gives a suggestion of action. This is a matter that must be decided by the character of the photograph on which they are to be used and must be decided by the individual worker (Fig. 63).

The reverse of this mask may be used to blow in a background on a negative instead of on the print. Such work on negatives can be done by a skilful air brush artist in a shorter time than by hand and the results are very much better.

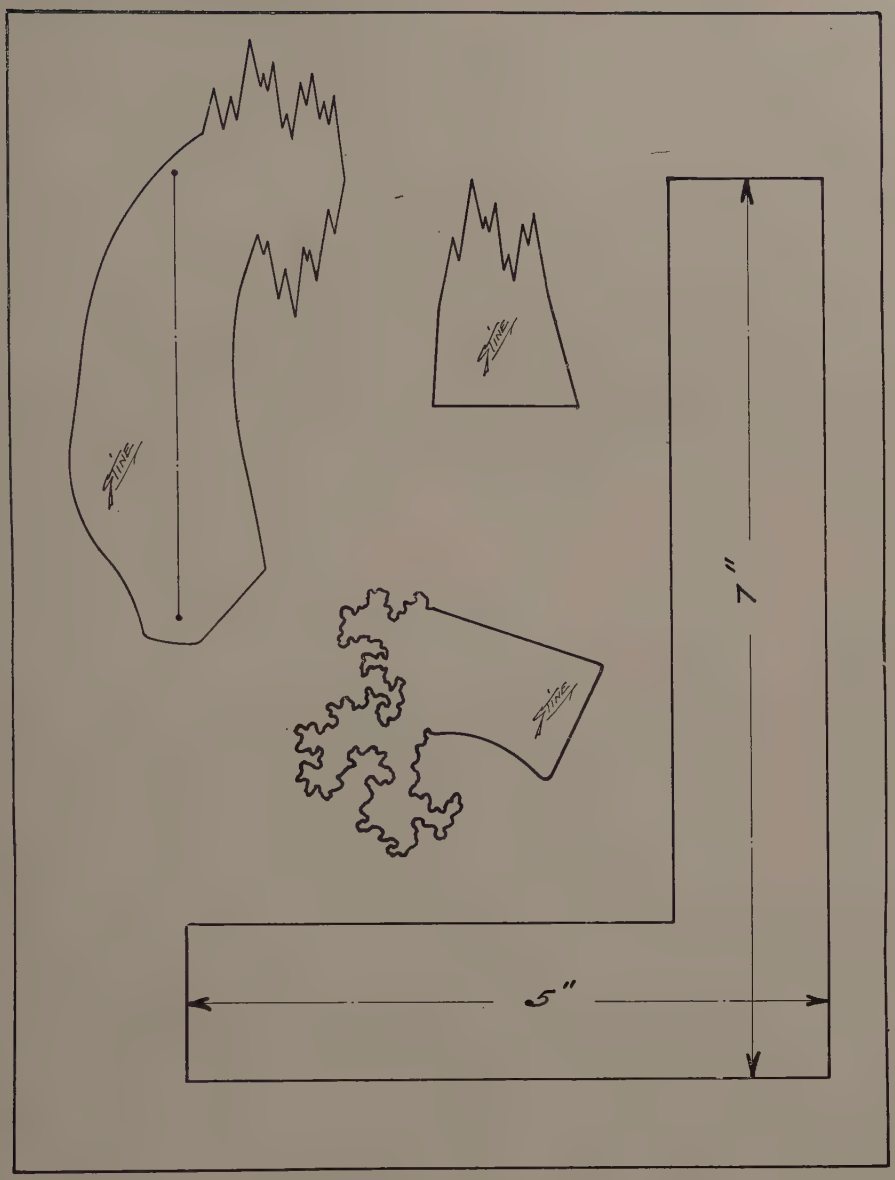

Fig. 59. Templates to be Cut from Celluloid

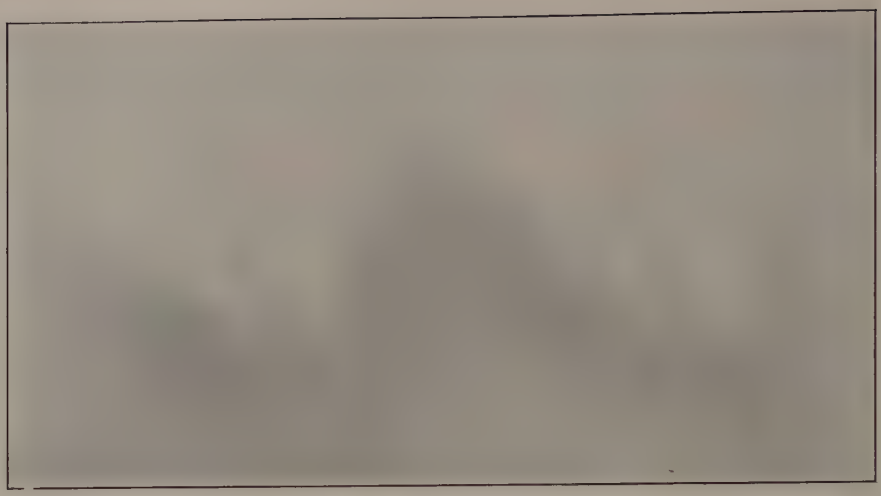

Fig. 60. Pointed Forms

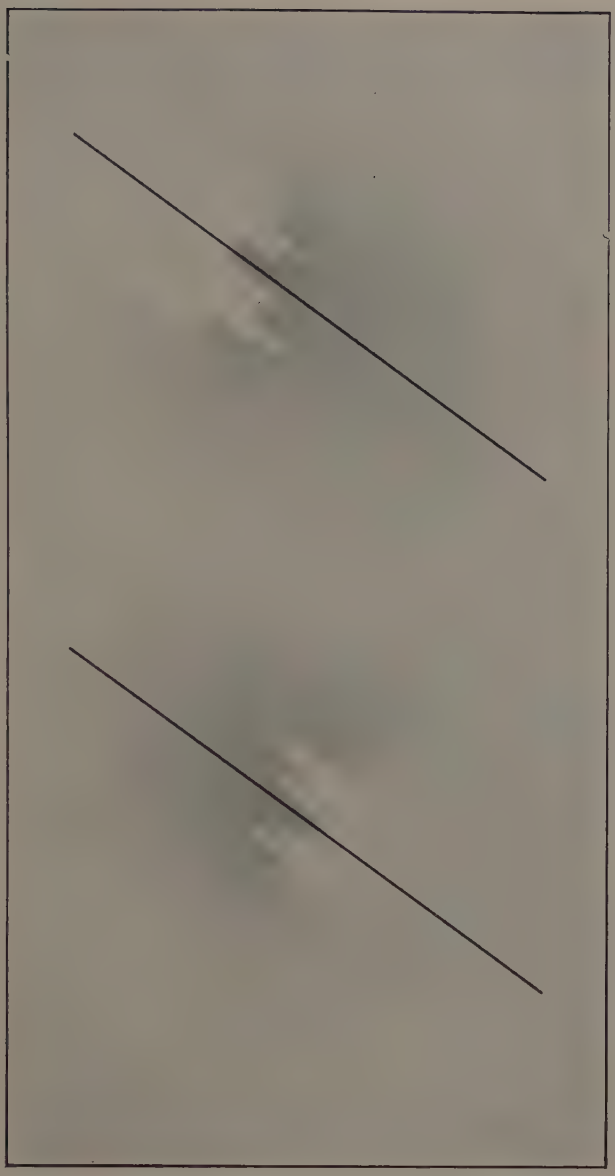

Fig. 61. How Pointed Forms Should Be Placed in Relation to Each Other When Used as Background

Fig. 62. Portrait with Pointed Form Background

Fig. 63. Pointed Forms Used Vertically

PORTRAIT WITH CLOUDED BACKGROUND

We have shown in the preceding lesson how the pointed form mask may be used in putting in a background in a portrait and this lesson shows how a clouded form may be used in the same way. This is a lesson to which considerable attention must be paid and is one which needs considerable practice if future work is to be handled successfully. To blow in a little suggestion of atmosphere and distance such as that shown in the illustration (Fig. 64), one must be master of the brush as regards controlling the colour, for the background must be quite smooth and even or the effect will be ruined. One should set the brush and the work at a distance from the easel in order to secure an even flow of colour, free from all spots. This flow and the distance at which to work can be determined after a few trials. One should work in all directions, having the colour flow only when the brush is in motion.

Fig. 64. Portrait with Clouded Form Background

LESSON TWENTY THREE

PORTRAIT WITH SQUARE CORNER BACKGROUND

While the plain square corner without a bevel edge is a design that is not much used in actual work, some practice with it will make future work easier (Fig. 65).

Take the square of celluloid which was used in Lesson Sixteen and place it in perfect contact with the photograph, being careful to see that it is placed in proper relation to the head and with its edges parallel with the edges of the picture, as the slightest crookedness will be very noticeable. Blow in a tint to the proper density with a good even spray. Be sure that the edges and corner of the square are clear-cut and try to avoid getting too much of the tint on the face. Some colour will get on the face, this cannot be avoided, but it will not be noticeable. Experience will dictate the proper position for the square which, of course, will differ with every portrait.

Fig. 65. Portrait with Square Corner Background

PORTRAIT WITH BEVEL EDGE SQUARE CORNER

Figure 66 is completed by following the instructions given in Lesson Seventeen. It might be stated here that in nearly every case where designs are blown around a figure, a certain proportion of the colour will fall upon the subject, but this does no harm as it is not noticeable to the eye, although one must, at all times, be very careful to keep as much colour as possible off the subject.

Fig. 66. Portrait with Bevel Edge Square Corner

PORTRAIT WITH SQUARE BACKGROUND

This design (Fig. 67) involves the use of both sides of the square and is obtained by following the instructions given in Lesson Sixteen, after which the form is simply reversed and placed on the other side of the portrait when the balance of the square is blown in. Care must be taken that the edges of these square designs are neat and cleanly cut and that there is no mark showing where the form was reversed.

A much more finished effect is gained by this design than by the use of the plain square corner shown in Lesson Twenty Three. The effect of distance, too, is greater. Here it will be noted that the square is completed in the lower left hand corner, which means that the celluloid form must be used in three different positions, and much care must be taken to see that the edges register correctly in each instance.

Fig. 67. Portrait with Square Background

LESSON TWENTY SIX

PORTRAIT WITH BEVELED SQUARE BACKGROUND

The complete beveled square, as shown in Fig. 68, is blown in as instructed in Lesson Seventeen. The square is completed by reversing the celluloid form and blowing in the design in sections, shading the bevel, as illustrated. Care must be taken that no lines or shadings show where the forms were reversed.

In Fig. 69 the same effect is shown applied to a full length figure. The same methods, of course, are used. The placing of such a background must be governed by one's sense of proportion and balance.

Fig. 68. Portrait with Bevelled Square Background

Fig. 69. Full-Length Figure with Bevelled Square Background

LESSON TWENTY SEVEN

PORTRAIT WITH OVAL BACKGROUND

In this lesson (Fig. 70) we find a use for the two celluloid ovals described in Lesson Eighteen. Place the smaller oval in perfect contact with the photograph and with a good even spray blow in a tint of the required density, keeping it uniform on both sides of the head. When this part of the design is complete, replace the smaller oval with the larger one, registering it carefully to have the margin an equal width at all points. Give a light wash over the entire design to secure the bevel effect, after which the shadows are blown in with a fine spray as described in Lesson Eighteen.

Fig. 70. Portrait with Oval Background

COMPLETED COLUMN

Figure 71 shows a column made by using the column form that was used for Lesson Nineteen. To air brush this column complete, place the form in its proper place and with a good spray, at the proper distance, blow in the column with a vertical swing of the brush until the desired density is obtained, always remembering that, to give the appearance of roundness, the centre of the column must be a little lighter than the sides. Having finished one side, reverse the template and place it in the proper position to give a width to the column appropriate to its height. Hold the template in perfect contact with the paper so that a clean-cut edge can be secured and blow in the second side to the desired shade. When this is done, light lines must be blown across the column connecting the curves at its base. A ruler or straightedge should be used as a guide for connecting the sides. When properly done, this gives form and roundness to the design.

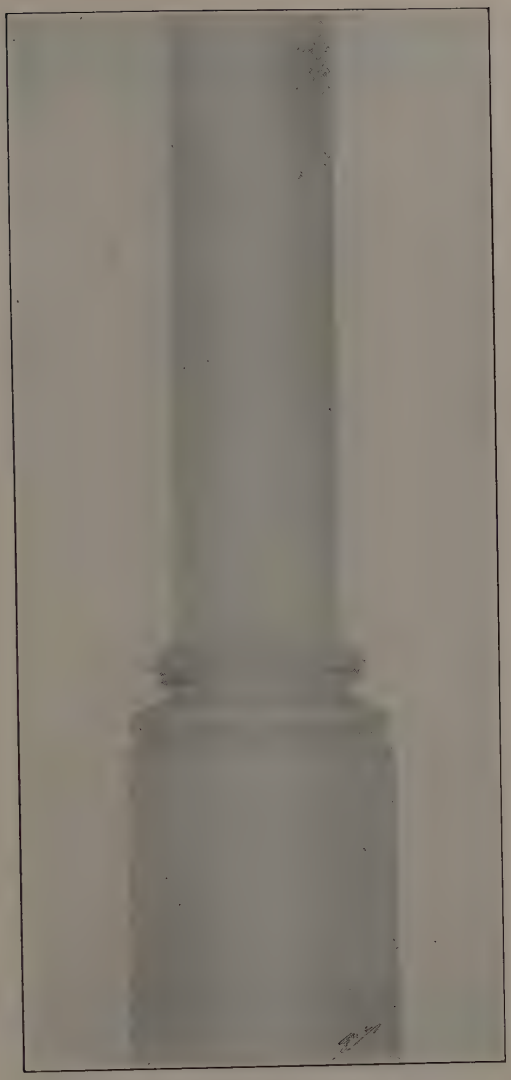

Fig. 71. Completed Column

Fig. 72. The Draperies Covered with a Light Wash of Colour

Fig. 73. Portrait with Completed Drapery Effect

Fig. 74. Vignetted Print with Body Eliminated

Fig. 75. After Blowing In the Neck and Shoulders

PUTTING IN DRAPERY WITH THE AIR BRUSH

It sometimes happens that sitters want a drapery effect in a picture but do not care to have the photographer drape them. With the air brush the sitter's wish can be gratified, for it is a comparatively easy matter to blow in drapery on a vignetted figure. Almost any picture that has a light background from which it is possible to make a good vignette of the head alone can be worked up into a draped picture. The shoulders and neck should be sketched on frisket paper laid down on the photograph and after this has been properly done the lines should be cut through with a sharp knife and the portion of frisket paper covering the neck and shoulders should be taken out. Great care must be taken to cut the line evenly around the chin of the subject and to cut very lightly so that the photograph is not marred. The cement remaining on the photograph can easily be removed by rubbing lightly with the fingers. The brush is then set to give a good spray best suited to the worker and the figure is blown in lightly, increasing the colour a little in the shadows to give form and roundness as shown in Fig. 73. When this is done, remove all the frisket paper and the cement and sketch in the flowers with a black china-marking pencil (if the print is in black and white), blowing in the shadows afterwards with a fine spray from the air brush. If the print is in sepia, use a Blaisdell sepia pencil No. 155, for sketching the flowers. This is a very good pencil for this kind of work.

The draperies should be covered first with a light wash of colour, after which the highlights should be cut out to give the soft drapery effect so much to be desired. When this has been done, with a suitable spray, deepen the shadows where necessary, to give form to the work. A study of the illustrations (Figs. 72 to 76) will show the effects to be attained.

The reader will very readily come to the conclusion that to work up a dozen prints in this manner would place a prohibitive price on them, but this need not be the case, for, if many

Fig. 76. Finished Portrait with Drapery Worked In

prints are required, one can make up the original print on a smooth surface paper and make a good copy of it, after which an ordinary vignette can be made and the prints finished on a matte or linen surfaced paper which will break up practically all the copying effect.

Fig. 77. Before Working Up with the Air Brush

Fig. 78. After Working Up with the Air Brush

LESSON THIRTY

WORKING UP VIGNETTES

This lesson (Figs. 77 and 78) teaches the value of working up the base of the figure as well as bringing in a suggestion of distance in the background in the production of successful vignettes. To fill in a vignette such as this at the base of the figure, one can use the same spray as is used for brushing in the suggestion of distance in the background. Both illustrations are from the same negative, the second one having been completely worked over with the air brush; in fact there is hardly a spot on the print that has not been touched with colour sprayed on by means of air brush. All the shadows have been built up and have been softly blended into the high lights. A really salable print has thus been made in a short time from one that otherwise had very little value. When working up a print of this kind, one must work nearer to the print, with a fine spray in the fine portions, and a larger spray at a greater distance where the areas to be covered are larger. After a few trials these varying distances and sprays will come naturally to the worker.

Bigger pictures are worked up in the same manner, by filling in the shadows and by blending one tone into another so that the finished print will have snap and brilliancy.

LESSON THIRTY ONE

EASTER DESIGN FOR PICTURES OF CHILDREN

"EASTER GREETINGS" is the very appropriate title of the picture shown in Figs. 79 and 80, and it is one with which the professional can undoubtedly increase his business if he uses proper advertising methods. This type of picture is very different from those usually shown and, like all cleverly made pictures of children, appeals strongly to the public.

To get good results in a picture of this sort one must have good control of the air brush in order to ensure the elimination of all spots. It is very necessary to apply the colour evenly.

After the print has been made as an ordinary vignette, the eggshell is placed around the subject by the use of a specially made stencil which is placed over the surface to be worked on. A light colour is then blown in, after which the colour is increased in the shadows to give form and roundness to the work.

Fig. 79

Fig. 80. Easter Design for Pictures of Children

LESSON THIRTY TWO

WORKING IN COLUMNS IN THE BACKGROUND

Two columns are shown in this picture (Figs. 81 and 82) and they are made according to the instructions given in Lesson Twenty Eight. Upon completion of the columns a faint suggestion of background should be blown in on the background, after which the shadow running along the right arm should be deepened and the vignette properly blended.

The column lends itself to many different arrangements and can often be worked into a picture to help out a pose that would otherwise seem awkward or uncalled-for. Pictures of this type are the " just a little different " kind which are so very essential if a real success is to be made.

Fig. 81. Incomplete, Due to Lack of Background

Fig. 82. After Working In Columns with the Air Brush

A COMBINATION PICTURE

Here we have an effect that never fails as a business producer. The combination print should first be made as in Fig. 83. The curl of smoke is then lightly sketched in with a pencil and over this is blown a light wash of colour. The brush is then set to give a medium fine spray and the shadows are blown into the smoke curl, also the little curl of smoke directly above the pipe. The clouded effect is also air brushed around the child's head with the result shown in Fig. 84.

It requires a steady hand and thorough mastery of the air brush to work in the smoke successfully in this picture and this lesson should be practiced until the student can work in the curves of the smoke evenly, gracefully and convincingly, for the effect of the picture depends upon the maintenance of its apparently unstudied appearance.

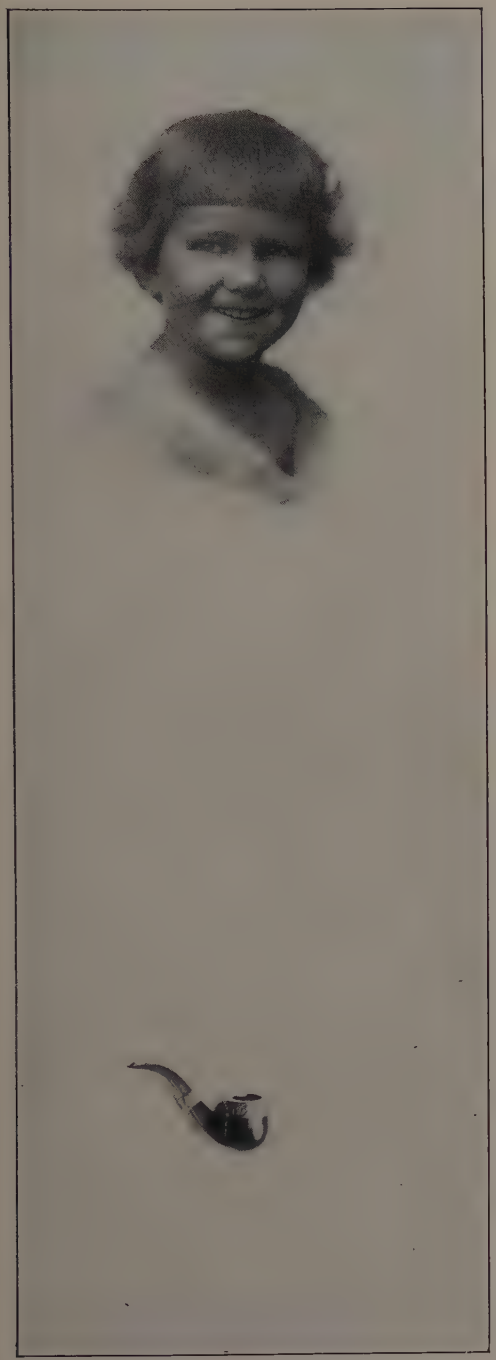

Fig. 83. Combination Picture Ready for the Air Brush

Fig. 84. "Daddy's Pipe Dream"

LESSON THIRTY FOUR

A CURL OF HAIR

This is a combination of the lines made in Lesson Five and is of great value in getting the proper swing of the air brush. Some artists use both hands to guide the air brush, when doing work of this kind, but it is preferable although not absolutely necessary to do all work with one hand if possible, as, in the opinion of the author, such a method gives a freer swing. This lesson (Fig. 85) looks hard, but after the swing is once mastered it is comparatively easy, providing the preceding lessons have been thoroughly learned.

Fig. 85. A Curl of Hair

LESSON THIRTY FIVE

THE MOUTH

Draw this example (Fig. 86) lightly with a pencil. Then, with the air brush, model it with short strokes and fine lines merged together. This is a fine test, showing how faithful you have been in mastering the previous lessons. Endeavour to get the right expression. Study as you work what it is that makes for an amiable expression. It is much easier to make a scowl or frown look natural than a smile.

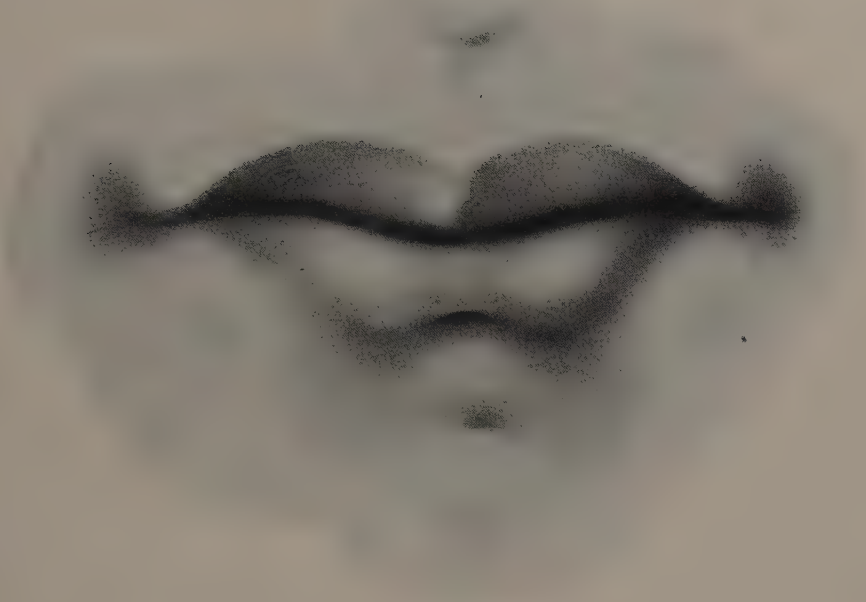

Fig. 86. The Mouth

THE NOSE

Draw the nose (Fig. 87) lightly but carefully with a pencil. Get the proportions as nearly right as possible. This is a combination of delicate work and deep shades with high and reflected lights. The proper use of the reflected lights has a great deal to do with the roundness and modelling. Draw outlines of noses in profile and try and model them up as carefully and as naturally as you can. The more originality you put into your work the wider will be the experience you will obtain. A touch or two on the lights with an eraser will help to get the result desired.

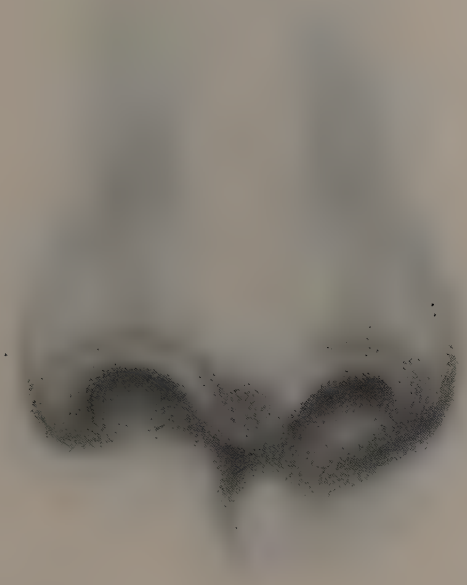

Fig. 87. The Nose

LESSON THIRTY SEVEN

THE EAR

Work in the same way (Fig. 88) as in the last two lessons. Keep the high lights clean and crisp. Do not attempt to blow colour on the dark places until the previous coat is perfectly dry, as the air pressure causes the colour to run. In a later lesson we will show that that fact can be put to good use. It is not necessary to stick to this masculine ear absolutely. Try making feminine ears and children's ears as well.

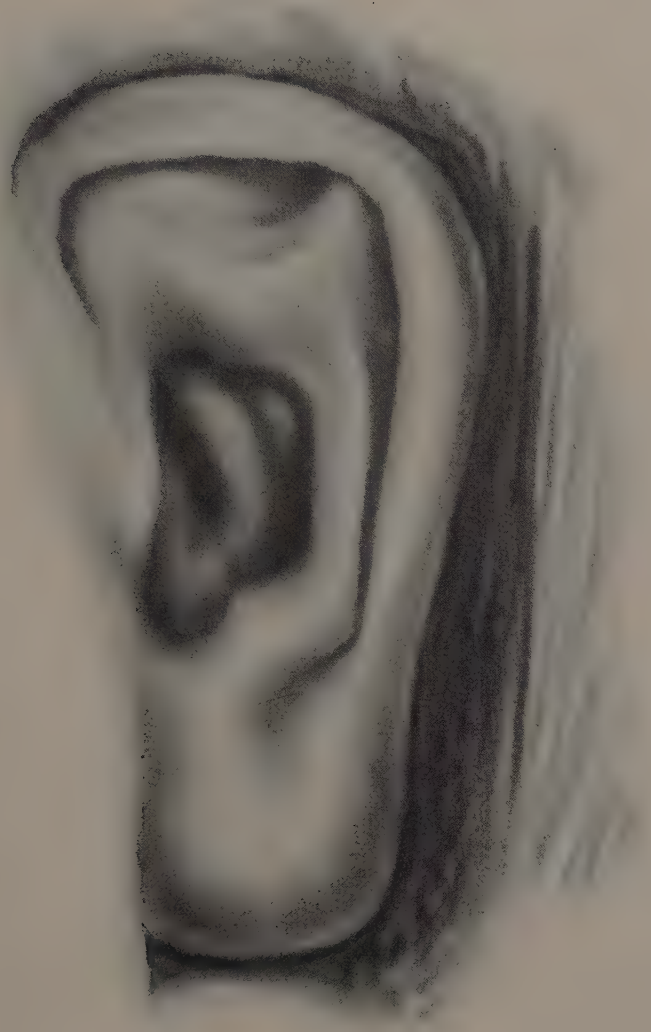

Fig. 88. The Ear

LESSON THIRTY EIGHT

THE EYE

The eye (Fig. 89) is the most important feature in the face as far as the portrait artist is concerned. The mouth can be covered with a beard, the nose with a fan. But if the character of the eye is lost the artist never can get a likeness. This lesson is quite hard, but there is a feeling of satisfaction on overcoming something hard that will repay you well. Draw the eye carefully and study it well. Try and make other kinds of eyes, half closed, roguish, sleepy, old eyes, young eyes and so forth.

Fig. 89. The Eye

LESSON THIRTY NINE

FINISHING LARGER PRINTS

Finishing larger prints with the air brush is not very difficult if all the preceding lessons have been properly mastered. One should always strive to make a bigger print as perfect as possible by dodging (if necessary) or by any kind of manipulation in printing that will tend to produce better results. One reason for this is that it will eliminate a considerable amount of handwork subsequently to be done on the print, which of course means a saving in time and money.

After the picture has been properly exposed, developed, fixed, sepiaed if required, washed and dried, it should be mounted on a good stiff card, preferably by the dry mounting process which will do away with all tendency to curl, and when this is done, one of the following solvents should be applied to the surface of the print:

1. Household ammonia, 5 oz.
   Water, 11 oz.
2. Equal parts of wood alcohol and water.
3. Ox gall.

Any one of these should be applied to the picture with a liberal tuft of absorbent cotton thoroughly saturated with the solvent. The reason for this will be explained later.

Everything is now ready for the air brush and the photograph should be fastened to the easel with a pin at each corner. Before beginning to work, however, examine the picture carefully and decide what needs to be done to improve it. The face, which is the centre of attraction in a portrait, should be considered first and should be finished first, by darkening shadows, where necessary, by blending one tone into another, or by toning down high lights if they are too strong in comparison with the rest of the picture.

Very often a decided improvement can be made in a portrait by darkening the pupils of the eyes and by strengthening the catch lights and the reflected lights by the application of white. Such work on the eyes adds snap and brilliancy to a

portrait and it is best accomplished by means of a number three red sable brush.

After all work has been completed on the face, one should work up the draperies, by giving form to them (where necessary), by filling in shadows and by subduing high lights.

Finally the background should be worked over to bring it into harmony with the figure, but it, and the draperies, must be subdued sufficiently so that the eye is first attracted to the face and travels therefrom to the other parts of the picture. A background should nearly always have some lighter areas which help to give distance and atmosphere to the picture. Let it be remembered that in a portrait, as a general rule, the highest lights in the picture should be in the face (Figs. 90 and 91).

If it is desired to " snap up " high lights and draperies, after a light wash of colour has been brushed in, it can be done by using a good quality pencil eraser cut to a wedge shape. If the high lights appear too dark, they can be brightened by the application of some good grade of white, suitable for use in the air brush.

In working up landscape pictures practically all that is necessary is to fill in the shadows, blending one tone into another, so as to give form, or possibly brushing in a few clouds into the sky. The high lights in the clouds can be cut out with an eraser to give lightness and form, which is very essential in the production of successful skies. In landscape, as in portraiture, the centre of interest should be the lightest part of the picture. After the picture has been completed, the whole print should be sprayed with a light wash of gum arabic and water.

Finishing bigger prints in sepia or black and white is an accomplishment of value to all professionals. It is safe to state that there never has been a bigger picture made that could not be improved in some way by means of the air brush. A large number of pictures are sold to customers when they really ought to be put into the waste basket, simply because the worker lacks the ability to put quality into the finishing of such pictures. They should all be worked up to the point where they become a credit to the photographer.

Fig. 90. A Bigger Print Requiring Considerable Air Brush Work

Fig. 91. The Completed Picture

COMBINATION VIGNETTES

The most difficult part of making up a combination picture is in getting a successful vignette, for the reason that in many cases, in order to place the picture properly in the picture space, the negatives must be placed very close together. Then again there are times when the subject is very close to the edge, so that in that part of the finished print one finds that instead of a nice blending there is a sharp line which makes the result anything but satisfactory even though the rest of the picture is satisfactory.

All of the above troubles were encountered with the combination shown in Figs. 92 and 93 and it therefore became necessary to use the air brush in order to finish the picture successfully.

The negatives were properly spaced and were attached to an 11 by 14 piece of glass after which a good spray of lampblack was used in the air brush and a light outline blown closely around the figures (free-hand), increasing the density as the vignette was worked away from the figures. This vignetting must be done on the glass side of the negative in order to secure a proper blending and the air brush should be used far enough away to give an even texture, after which the remaining portions of clear glass should be opaqued. This was done in the examples shown, the opaque slightly overlapping the air brush work, to give a clear white ground.

In making such combinations, after the prints have been properly dried and flattened, the air brush should again be brought into use and the vignette improved, if possible, after which a little suggestion of distance should be blown around each subject as shown in Fig. 93. It often happens that some portion of the subject is too dark in relation to the rest, which was the case in this particular example, as is clearly shown in Fig. 92. To overcome this fault, a light wash of colour was blown over the draperies as well as over the arm of the figure in light costume.

Before applying the colour, the glass side of the negatives must be thoroughly cleaned. Solutions for this purpose have been described in a preceding chapter and either one of the following may be used:

1. Household ammonia 5 oz.
   Water 11 oz.
2. Equal parts of wood alcohol and water.

Unless one of these is used, the colour is liable to adhere to the glass in spots which will quite ruin the result.

Fig. 92. Vignetted Combination Presenting a Number of Difficulties

Fig. 93. Completed Combination Print

LESSON FORTY ONE

WORKING ON THE NEGATIVE

The first thing to be considered when beginning to work-in backgrounds with the air brush is a suitable place to work. The best system is to have the negative placed on an easel before a good, north light, with ground glass behind the opening for the negative and with all light excluded except that which passes through the negative.

The working-in of backgrounds with the air brush is a rapid and simple business if one has studied the preceding lessons attentively so that the brush can be controlled with ease.

The simplest background to work-in, and one that is best for the beginner, is one in which the figured ground that was used in making the picture was placed in too much shadow and therefore only a barely perceptible outline of the ground appears on the negative. The background in such a negative naturally prints black, which is anything but pleasing, and one should therefore strengthen the high lights and blend therefrom into the deepest shadows, always keeping the highest lights in the background a tone or two lower in key than the high lights in the subject.

By working on the glass side of the negative, softness is secured because of the thickness of the glass and, also, if the design is not entirely satisfactory, it can readily be removed.

Before beginning to work, the glass must be thoroughly cleaned in the manner described in the preceding chapter. Never allow the fingers to come into contact with the glass after it has been cleaned, as a finger mark might be left thereon to which the colour would refuse to adhere.

If one has a negative with a clear background, a little mottled design can be very quickly worked-in by blending a few high lights upon the negative in proper relation to the subject. If a more elaborate background than this is desired, it is better to work it in on a separate piece of ground glass which, in printing, is placed in contact with the negative. This is a good way to do it if the negative is one that is made on a cut film. The

Fig. 94. Worked-In Background, Printed Through One Thickness of Glass

Fig. 95. Portrait with Plain Background

Fig. 96. Portrait with Printed-in Background, Made Through Two Thicknesses of Glass

Fig. 97. Print from an Unsatisfactory Negative

Fig. 98. Print from the Same Negative After Working Up with the Air Brush

ground glass and the film can afterwards be bound together and used as if it were a negative on glass.

In making the background on a separate piece of ground glass, the negative and the glass should be placed upon the easel with the ground glass on top of the emulsion side of the negative, in which position the emulsion side of the negative and the ground side of the ground glass should both be towards the operator, as the background is to be worked-in on the ground side of the glass.

If one wishes to work-in a ground similar to that shown in Fig. 94, the design should be drawn on stencil paper in proportion to the figure and then cut out with a sharp pointed knife like a stencil knife. One must bear in mind that the negative part of the stencil form must be used, as the background is to be a negative. The stencil should be placed upon the ground glass after it has been properly cleaned with alcohol and water, and it must be placed in proper relation to the subject (Figs. 95 and 96). Fill the colour cup with good strong lampblack or waterproof colour, preferably the latter, and proceed to blow in the design, blending from high lights to deep shadows as the design requires and using a spray that is best suited to the individual worker. After removing the stencil, one can cut out shadow, if necessary, with a good pencil eraser cut wedge shape, or build up the fine high lights with a soft pencil. Where the design meets the figure, it should overlap the outlines of the subject about one thirty-second of an inch.

Let it be remembered that the highest lights in the background should always be a little lower in tone than the high lights in the portrait.

During the working on the ground glass one must at all times be sure that the negative and the ground glass register perfectly at the lower left hand corner.

Upon the completion of the background, remove it from the negative and replace it so that the worked-in side of the ground glass is next to the glass side of the negative.

When ready to print, place the ground glass and the nega-

tive in the printing frame and register them perfectly in the lower left hand corner.

One can make up a great variety of these designs to register with a number of different negatives of a standard size and sitting.

These grounds are easily removed by washing with soap and water if lampblack has been used, or with wood alcohol in the case of waterproof colour, and then the same piece of ground glass may be used for other purposes or for a different design.

The same method of working may be used to improve negatives that give rather flat prints of the kind shown in Fig. 97 and such negatives can be worked up on the glass side so as to secure results such as is shown in Fig. 98.

The pictures shown to illustrate this are necessarily of the extreme type in order to show clearly the almost unlimited possibilities of the air brush for such work as this.

If the negative is on glass, the glass side must be thoroughly cleaned before any colour is applied and the brush should be set to give the individual worker the best spray for the particular part to be worked on. The colour is blown on to the glass side to the required density wherever it is required to build up the high lights and give snap and brilliancy to the negative. It takes considerable practice to master this kind of work, for the blending must be as nearly perfect as possible. This kind of work as well as other air brush work will well repay the photographer for all the time spent in practice.

PART III

COLOURING PHOTOGRAPHS WITH THE AIR BRUSH

By GEORGE F. STINE

INTRODUCTORY

Although this section deals with the colouring of photographs of all kinds by the use of the air brush, it is intended to describe particularly the use of transparent colours on photographs.

A photograph that has been properly made contains lights and shades in perfection. The colouring adds tone and colour and it should be accomplished with colours as nearly transparent as possible, so that the colours do not obscure the most delicate detail.

There are some who declare that there is no art in the colouring of a picture, especially with transparent colour, but if that is true, then there can be no art in the use of colours: the art of colouring becomes no art at all and all pictures might just as well remain in the black and white form as far as art is concerned.

The fallacy of this statement is easily apparent even to those who have had but little training in art.

It is true that a photograph is the foundation upon which the colours are applied and that the gradations in the photograph, to a great extent, give the variation of shades in the coloured print, but this does not imply that a person without some artistic skill can colour artistically.

The writer does not claim that the mere reading of these lines will make anyone a skilful colourist; on the contrary, perseverance and artistic skill are necessary before one can expect to become an expert.

By observation and reading one can learn a great deal, but the old adage still stands, that there is no teacher like experience; therefore if the reader will follow closely the instructions given herein and will not become discouraged if the first attempts do not prove entirely satisfactory, experience, close observation and study will give that perception of the harmony of colours which will enable one to colour artistically and with technical correctness. Those who have had some experience in other kinds of painting or colour work will find, after they

have mastered the handling of the brush, that the use of transparent colours is a very simple matter.

The instructions given here are intended principally for the use of transparent indelible water-colours. As to the particular brand of colours to use, any brand of this type of colour manufactured by a reliable firm will answer the purpose.

CHAPTER ONE

THE OUTFIT

The outfit of tinting colours and the necessary tools for colouring photographs cost much less than for any other class of painting and the initial outlay is remarkably little when one considers the returns received for this class of work. Very few articles are needed, but all of them should be of the best quality so that one will not be troubled by faulty tools.

As has already been stated in Chapter Twelve of Part I all shades of colour can be produced by mixing the three primary colours, red, yellow and blue, but the mixing of these primaries to secure the desired shades should not be attempted by a beginner as it is a very deep study and, at first, one's energy would be wasted as most of the principal tints are made up by experts, ready for use by the artist, and therefore this rather difficult and complicated business of mixing the primaries can be left alone and colours and tints can be purchased already mixed and ready for use. Some knowledge of mixing, however, must be acquired, as it would be impossible to provide all the various shades and tints that are required.

There are upon the market various sets of colours intended for use in the air brush, but care must be taken in selecting, as there are some colours that are supposed to be good for use in the air brush which, upon close examination, will be found to contain grit which, of course, is injurious to the brush. There are some sets containing a small number of colours, but one will find it cheapest in the end to select a set that contains not less than twelve of the most frequently used tints. These most needed colours are scarlet, deep yellow, dark blue, dark green, dark brown, flesh, violet, rose, orange, wine, purple and magenta.

The first thing to consider when purchasing is to obtain colours that are as nearly permanent as possible. Colours that contain any aniline dye are not absolutely permanent and therefore one should be sure to obtain colours that are free from such dyes. The transparent liquid water-colours that are prepared

especially for use in the air brush are undoubtedly the best to use, although if one wishes to make up one's own liquid colours it can be done very easily. Purchase permanent colours in pans and secure a number of one ounce bottles, labeling each bottle with the tint to be placed therein. When this has been done, remove the colour from the pan in which it came, break it into small pieces, placing it in one of the bottles and adding half an ounce of distilled water, which will dissolve the colour. After each colour is thoroughly dissolved in its respective bottle, it must be strained to eliminate all grit. This is best accomplished by straining the colour through a piece of the finest and best muslin obtainable, using a piece about four inches square for each colour. Each colour should be filtered into a small glass or other receptacle and after the bottle has been rinsed, the colour may be poured back into the bottle. The colour is then ready for use and should be diluted to the required strength so that each tint can be built up to the desired density. This diluting is best accomplished by placing the colour in the air brush colour cup and adding pure water.

In addition to the colours one will need a palette, the best one to obtain being a china palette with twenty one round recesses and a cover, also the following accessories:

Two and one-half inch water glass
Number one Russian sable brush
Number three Russian sable brush
Number five Russian sable brush
Two ounce package of absorbent cotton
Medicine dropper
Push pins for fastening the photograph to the easel
Artist's stand.

This completes the outfit for colouring with the air brush, with the exception of the air brush itself, which is understood to be already in the possession of the student. As regards the colour cup used in connection with the air brush, a flat-bottomed cup is better than one that is cone shaped, as the flat-bottomed cup can be placed on the stand without upsetting while the

cone shaped cup cannot. It is advisable to have several cups for different colours, although this is not absolutely necessary, as it is easy to rinse out the cup without removing it from the air brush before using another colour.

The picture to be coloured should first be studied carefully to see what colours will be needed. These colours should then be placed in the palette and diluted for use with the dropper. The dropper must be thoroughly cleaned before using it for a different colour. This can very easily be done by drawing it full of water and discharging the contents into some other vessel. The water used for diluting the colours must always be clean.

CHAPTER TWO

COLOURS AND COLOUR COMBINATIONS

The three principal colours are red, yellow and blue and these are termed primary colours. If any one of these is combined with another, the result is known as a secondary colour. The secondary colours are green, made up of blue and yellow, violet, a combination of red and blue, and orange, composed of red and yellow. When the secondary colours are combined the result is a tertiary colour. This cannot be done in practice with every colour, especially those purchased in liquid form, as some of them will not combine chemically but will precipitate and give a dirty mixture which is practically valueless as a colour. Most of the best colours, however, will combine perfectly and any variety of hue can be obtained.

In case one is using colours that do not combine properly, the desired shade can be obtained by washing one colour over another on the photograph until the colour is right, and this is good practice, even when the colours that are being used are the kind that will combine properly. For example, suppose we want a green tint and the colours will not combine, we can give that particular part of the picture a wash of blue and over that a wash of yellow, and the result will be green. If we want brown, we can put a wash of red over the green and the result will be the tertiary colour, brown. The shades of colour will, of course, depend upon the relative strength of the composing colours. In mixing yellow and blue to obtain green, if the yellow is stronger than the blue, we shall have a yellowish green, whereas, if the blue is in excess, the result will be a bluish green. It will thus be clearly seen that by varying the strength of the composing colours any desired shade can be obtained, and practically every shade of colour can be obtained by some combination of the primary colours. If we combine all three of them, each full strength, the result, theoretically, would be black, if each colour were pure and of the best quality. To obtain good results from mixing the primaries, the colours must be abso-

lutely the best obtainable and must be true colours, scarlet, dark blue and deep yellow.

Yellow and red are colours that are warm in tone and blue is termed a cold colour. Orange, therefore, being composed of yellow and red, is the warmest colour known. A green may be either warm or cold, depending upon whether the yellow or the blue predominates, and so it is with all the secondary and tertiary colours.

One hears very often the term complementary applied to colours. The complementary of any colour is the colour that is required to complete what is termed the scale of primary colours. For example: red is complementary to green, as green is made up of yellow and blue and it takes the red to complete the scale of the primary colours. Blue is complementary to orange, because it takes red and yellow to complete the scale, and yellow is complementary to purple, which is composed of red and blue.

In order to acquaint the student with the principal colours in use, a brief description of each colour is given.

Flesh. This colour is so named because it is usually the first to be placed upon the face. It is similar to a very deep orange or what may be termed a reddish orange, in which the red is in excess of the yellow. For light complexions a little yellow should be added before applying the colour to the face. Flesh colour may well be placed over dark shadows or draperies, when it serves as a good brown and looks better than brown itself would look. It can also be mixed with varying shades of green to give varying shades of brown. It can be darkened by the addition of blue and lightened by adding yellow. It is a good colour to use in the shadows of a landscape picture and is very useful for sunset effects.

Scarlet is a very powerful colour and is one of the most important among the reds. Weak washes of scarlet over draperies give a very pretty pink. It is a useful colour for flowers and may often be used very weak for flesh tints. It is one of the very best reds, as almost any colour can be produced with it in combination with yellow and blue. For ordinary shading

the same tint should be used; if the shadows are very deep, use dark green or purple.

Deep yellow is an indispensable and very fine working colour. It warms up draperies and dark backgrounds, producing beautiful effects. In combination with blue it will give a variety of greens suitable for portraiture or landscape painting. It mixes well with reds, producing orange, flesh colour, etc. Shade with the same colour, but in the deepest shadow use gold.

Dark blue is a very important colour, in fact, it is indispensable, as it is one of the primaries. If it is a trifle slow in action, it can be made more energetic by the addition of a little acetic acid, No. 28. By combining it with gold and yellow, various shades of green can be produced and it combines well with any of the reds to produce various shades of plum, purple, etc. As this is a cold colour, it may become necessary to warm up the shadows with flesh colour, unless the photograph is of a warm brown tone. It is good for shadows, for pearly tints and skies.

Dark green is a colour that will be found to be very bright and suitable for practically every purpose, especially for draperies. By the addition of scarlet, a variety of greens and browns are produced. Shade with the same colour and in the deepest shadows use scarlet.

Dark brown is an important colour and on account of its make-up one must use care in applying it to a photograph. If it is applied too strong, it will be found on drying to resemble a reddish brown. If it appears too red, it can be subdued with a light wash of green, but care must be taken not to apply it in excess. Brown can be lightened by the addition of yellow. In the shadows the same colour should be used with blue in the deepest shadow. Brown can be used for dark shadows on faces and for green draperies, etc.

Violet is a bright, gaudy colour and therefore must always be used in weak washes. When used weak over light shadows, mauve and lilac are produced. If more strength is required, it can be obtained by repeated applications. Shade with the

same colour and in the deepest shadows use flesh colour or dilute orange.

Rose is one of the favourite tints of red and produces very pretty effects in either weak or strong washes. It may be used dilute for flowers, pink dresses, etc. It is very good for tinting the lips and cheeks of youth. It is unfortunate that this is a colour that cannot be strongly recommended, as it is fugitive when applied in weak washes. Shade with the same colour and in the deepest shadows use magenta. It can be mixed with magenta to give greater depth.

Orange is a colour that is somewhat similar to flesh and gold, but it is very different in character. This colour can generally be used wherever flesh and gold are appropriate. It is very beautiful for sunset effects in backgrounds.

Wine is one of the reds which is very dark. It is appropriate for draperies and may also be used effectively for dark shadows on the face, especially around the eyes, nose and mouth. Shade with the same colour.

Purple is not quite as powerful as violet, but it is of greater permanency and will often be found more desirable. The shade can be varied by the addition of scarlet or blue. Shade the shadows with rose.

Magenta is a very brilliant colour and gives a rich quality to dark draperies. It can be used as a flesh tint. Shade with the same colour.

APPLYING THE COLOURS

If the print is a small one, it may not be necessary to mount it. But an enlargement or even a print of any size should be mounted on a stiff card. This will keep the print flat and the colouring will be easier. The dry mounting method is the best to use, as in that way all tendency for the print to curl will be eliminated. If this cannot be used and the photograph must be mounted with paste, it should be left under pressure until it is thoroughly dry so that it will not curl. The objection to mounting with paste is that it takes a long time to dry under pressure.

One of the following solvents should be applied to any coated photographic paper before attempting to do any colouring. Platinum papers require no such preliminary washing as they have no coated surface. In all gelatine coated photographic printing papers it has been found that there is a certain amount of grease, especially where the fingers have come in contact with the print, and on some parts the colour will refuse to hold while the surrounding portions will require it. These solvents will obviate all such difficulties. Any one of the three will be found to be satisfactory. For small prints, when the expense would not make its use prohibitive, we recommend the use of ox gall.

Solvent No. 1. Household ammonia 5 oz., water 11 oz.
Solvent No. 2. Equal parts of wood alcohol and water.
Solvent No. 3. Ox gall.

CHAPTER FOUR

THE FACE AND HANDS

As is well known, the face, in a portrait, should be the centre of attraction. Therefore this part of the photograph should be coloured first, then the hands, if they are shown. After this the figure itself and last of all the background.

If the picture requires spotting or any such manipulation, this should be done before any colouring it attempted. If it is an enlargement, it will often be advisable to work it up with the air brush before colouring. As a matter of fact the picture should be absolutely finished as a black and white or sepia print before any colouring is done.

To secure the best results in colouring portraits, one should have as a foundation a good rich sepia print. A black and white print does not answer the purpose quite as well and it does not give the fine quality that is imparted by a sepia print. This, however, is not the case when colouring landscape pictures.

It is well to remember that when colouring portraits we should be very careful never to overcolour. It is far better to have only a slight tint than to colour strongly. It is also better not to attempt to work up the shadows at all than to do so and produce glaring results, but as it is usually necessary to work up the shadows in order to secure really first class results, it is a good plan to apply the colours weak and, if necessary, apply several washes to obtain the desired density.

Good results can be accomplished in a short time if the student is careful and patient.

If the flesh colour is found to be too red after it has been applied, add a little yellow or gold to it.

When applying colour to the face and hands (if they show) be careful not to blow the colour outside of the figure so that it will be noticeable.

When the flesh colour has been applied, remove what is left of the colour in the cup, taking it out of the cup with the dropper and replacing it on the palette. Then rinse out the colour cup with clean water and run some water through the cup to clean

it thoroughly, after which the brush will be ready for the next colour, which is rose. Place this tint carefully and sparingly on the cheeks and in the shadows on the face and hands. Then remove that colour from the cup and clean it again. (This must be done after each colour.) Now take a Russian sable brush of a size best suited to the part to be worked on and fill in with rose colour lightly, to give depth, in all the small shadows around the ears, eyes, nose, mouth and neck. Also apply rose to the lips and in the shadows of the hands if they show. At the same time, with a small red rubber eraser, remove colour that has been blown over the whites of the eyes. It is almost impossible to keep the colour out of the eyes while colouring the face. Colour the iris of the eyes and blacken the pupil of the eye with one of the small brushes and India ink. Fill in the catch light with white, to make it more brilliant. Blend the rose, very weak, from the inside corner of the eye slightly onto the white eyeball, as one finds it in real life. A picture can often be improved by applying a very little yellow to the high lights, but be very careful not to overdo it. This is especially appropriate in portraits of elderly people. The use of magenta instead of rose on the cheeks and lips of elderly people is usually more satisfactory.

Scarlet in all cases may be lightly placed on the bridge of the nose to add life to the portrait.

Complexions that are light should contain more yellow in the flesh tones and the washes should be applied more lightly. If the complexion is dark, add a little brown to the flesh tones and use more yellow in the shadows. If the eyes are very dark in the print when they ought to be brown, all that is necessary is to give them a wash of flesh colour. Use the neutral tint for black or grey eyes and blue-grey or blue for blue eyes. The pupils can be touched up with neutral tint to give them more brilliancy if desired.

One of the best tints to use for grey or pearly tints would be blue-grey, although blue itself (diluted) may be used with very good effect.

Should there be small spots in the finished coloured print,

they can be very easily removed by the aid of the retouching pencil, if applied lightly and carefully, or with a spotting brush and colours.

Colouring the hair, especially a dark brown, often is a problem, and in some cases is difficult, as the red is apt to predominate upon drying. If this should be the case, it can be subdued by applying a light wash of green. If the hair is a very dark brown, first colour it with a neutral tint and, after this has dried, apply a light or dark brown until the desired shade has been obtained. The lights in brown hair should incline towards purple, but the shadows can be of the local colour, shaded with a little purple-brown or, possibly, magenta.

For blonde hair use brown madder with a little gold added. Use brown madder for the light shades of brown hair. If the hair has a drab colour, give the above tints a light wash of neutral tint or blue-grey.

For pure blonde hair use gold, raise the high lights with yellow and shade with neutral tint.

For red hair, dark brown with a little flesh colour added gives a very pretty effect. If the hair is very red, use scarlet and shade with a cold colour.

For grey hair use neutral tint and shade delicately with brown. For the high lights use white.

Black hair usually needs no colouring provided the sepia tone in the print is not too noticeable. If it is, use a wash of neutral tint, touching the high lights with white. If the neutral tint is too predominant or bluish, add a light wash of brown to secure the desired shade. One can make various shades of black, grey and brown by mixing the primary colours, red, blue and yellow.

CHAPTER FIVE

SHADING AND COLOURING DRAPERIES

Success in colouring draperies depends very much upon neatness, for if there are streaks, stained edges or uneven patches in the colouring that are noticeable in the finished print, the result must be considered a failure no matter how well the colours may have been selected as regards colour harmony. It is very important also to be very careful not to overlap the various colours as this also will prove ruinous to the work.

It will be found that it is not very difficult to do creditable work when one can select the subject and the colours, but when the work is being done as a means of livelihood as well as for pleasure, it is necessary to be able to do good work on a poor photograph as well as on a good one. If the instructions given here are followed carefully, it will be found to be possible to do justice to practically any kind of portrait or landscape.

In many cases the draperies will admit of a variety of colours, and it will not be found difficult to match almost any tint worn by the subject if a sample is at hand, but if the colouring is being done from description of the colours it is usually necessary to match the tint as nearly as possible by one's own idea of that description.

If the general shading of the draperies is light in the photograph, it may be assumed that the colour of the original is some light tint and therefore the colour must be applied very lightly or the effect will be flat and very inartistic, as the shadows will not be strong enough to support a strong tint unless they are deepened and high lights are added to bring out brilliancy in the print.

The question has frequently been raised whether or not it is possible for the hair or draperies to be coloured black by the aid of transparent colours, and the answer is yes. A dress can be coloured in any tint or even deep black if one should wish to do so, but if the draperies are black it will be found that the shadows are hardly noticeable and it will become necessary to build up the high lights with white. Usually there is very little that

need be done on draperies if they are black and white, provided the print has been well made.

If it is found that the draperies or hair are not dark enough, a wash of neutral tint usually will give the desired effect. If then they become too bluish, a light wash of brown or flesh colour will subdue it.

Should one wish to obtain a black over an even white surface, it can be accomplished by mixing the three primary colours, red, blue and yellow in proper proportions, or by three successive deep washes of the three colours over the white surface, and the result will be found to be a deep, rich black. The same result can be accomplished by adding to dark green its complementary colour, scarlet.

It is not necessary to mix the primary colours to secure black, as it can be done by taking any secondary colour and adding to it its complementary colour. It is much easier to darken a tint or to get a black tint by washing one colour over another than by mixing the colours in the colour cup. As we have seen above, a wash of scarlet over dark green will produce black and it is easy enough to change a tint to a darker one, but it is impossible to change a dark tint to a light one.

If by mistake the hair in a portrait has been coloured red when it ought to be brown or black, it can very easily be changed, but it cannot be changed to blonde by using transparent colour. Red can be changed to brown by washing over it with dark green, but if the green is applied in excess, the result will be black. Almost any tint can be modified but it cannot be made lighter except by washing off the colour and starting all over again.

CHAPTER SIX

COLOURING BACKGROUNDS AND ACCESSORIES

This is a part of the work that requires delicate handling. The beginner almost invariably has a tendency to overdo the colouring. This must be carefully avoided; the colours should be applied in very weak washes and should be very even.

In colouring the background, be very careful to avoid overlapping onto the figure, as this will spoil the picture, and always bear in mind that the background should be coloured last, after the figure, face, hands and draperies are all finished.

Colour the background with boldness and apply wash after wash of colour until the desired tone and blending have been secured.

In the backgrounds of portraits of young people it is well to use a weak wash of blue, purple or grey. It is not necessary to extend the colour over the entire background when the photograph is vignetted, but simply around the shoulders and head, using, if one wishes, the zigzag pointed mask described elsewhere. The colour must in all such cases be heavier next the figure and should blend from there into the paper itself.

For older people and for those with a dark complexion brown will be found a very good colour to use in the background, with greenish tints in the shadow. It is sometimes unfortunate that one cannot change dark backgrounds to lighter ones with transparent colours after the print is made, but one can lighten the ground to some extent by the application of a wash of yellow or gold, which gives it a beautiful warm tone. The background never should be bright and glaring, always subdued and subordinate to the face and figure upon which the interest is centred. A properly coloured background will add immensely to the value of the picture, but everything must be kept in strict harmony with the subject, which must always be the chief object of interest in the picture.

Each worker must use his own judgment in the colouring of draperies, carpets, etc. For woodwork, usually, a gold-

brown or neutral tint best serves the purpose. When colouring a landscape background always remember that blue gives distance and that objects in the foreground should be more distinct than those in the distance, that is to say, more distinct both in colour and line. A bright green should not appear in the distance because it could not be so in nature, on account of the bluish haze which is nearly always present and which is especially noticeable in distant views seen from a mountain top or across valleys. It is very easy to ruin the perspective of a picture by making such a mistake as this.

It is an error to give the landscape a wash of any bright colour without regard to the distance. For the middle distance a bluish-grey will be found to be best suited. A wash of blue-grey over green gives a very pretty hazy effect. It is very helpful to procure some good books on art and study them carefully, but there is no better teacher than nature herself, and the best possible training for a colourist is to study beautiful landscape, sunsets, etc., which are so plentiful. In them the earnest student can discover many of the secrets of nature's beauty.

When colouring sunset effects near the horizon, scarlet, gold and orange may be used, either singly or in combination, depending upon the effect desired. Let it be remembered that the blue sky always appears a deeper shade overhead than it does on the horizon, and colour the picture accordingly.

Red, yellow and blue should be mingled in the picture to produce harmony of tone.

CHAPTER SEVEN

COLOURING LANDSCAPES

When one stops to consider the great variety of subjects coming under this head, it will be readily seen that it is quite impossible to describe them all in detail in a book of this nature. Then, again, a brief discussion of this branch of colouring is better, for the reason that by delving too deeply into it the average student would be apt to become confused and in the end would have learned but little. These instructions will therefore be rather brief although complete to the extent that a student who masters them will be able to do creditable work and receive fair returns for it.

There are certain definite rules which if used intelligently will enable the student to do work of good quality in a remarkably short time, provided the student will also use his own individuality and observation.

The first general rule to be remembered when colouring landscapes is that as the distance between the foreground and the background increases and the distance becomes hazy, so the colours must become weaker and hazy as they work into the distance. The tints used in colouring the distant parts of the landscape must therefore be of a bluish-grey tinge to give a true effect of distance. Bright tones can only be used for objects in the foreground and as they recede into the distance the tones must become weaker and more hazy until they merge into the horizon.

The second rule is this: As was previously stated, the sky always appears bluer directly overhead than it does at the horizon. This is due to the fact that when looking overhead we are looking through a greater density of atmosphere, and the blueness is not obscured by dust and mist as it is when looking towards the horizon.

The next point to keep in mind is to notice where the shadows fall, as the shadows indicate the time of day. The colour of the sky and the relation of the clouds in the sky also are modified by the time of day.

Portraits are usually made under conditions in which the light can be controlled at will, but such is not the case with landscapes. The best time of day often can be selected, and it will usually be found that a picture can be made at a certain time of the day that is more pleasing than at other times, but the light is not under control as it is in the studio.

It must be remembered that a picture made during the bright months of summer when the sun is near the zenith must be coloured very differently from one made at a time when the sun is lower, even though both pictures were made at about the same time of day.

If the pictures have been made personally by the one who intends colouring them, the securing of the right tints as they were observed when the pictures were taken is a matter of close observation and study of notes taken at the time, but if the picture to be coloured is one with which the colourist is not familiar, it is a more difficult proposition. A careful study of the position of the clouds, shadows, and other details becomes necessary if one wishes to put out work that will bring in profitable returns and will add to one's reputation. The time of day at which the picture was taken has much to do with the colour effect and this must be studied carefully if the picture is to be coloured effectively.

Landscapes in which the sky is devoid of clouds are not nearly as pleasing as those in which the cloud effects are well balanced, therefore if one should have a picture of this kind for colouring, it can be improved by tinting in a few high lights on clouds near the horizon line, using dilute orange and filling in the shadows with neutral tint. This will be found to be especially good if the sky leans towards a pearly grey. This tinting in of clouds should be done very lightly so that it will not produce a hard effect.

The colouring of the shadows in landscapes is very important, as one can readily see that the colour of an object in the sun is quite different from that of the same object when in the shade. The brightness of direct sunlight intensifies the

colours. The shadows of objects in the sun are invariably darker and warmer in tone.

Do not colour too vividly. This is an admonition that must be observed as carefully in colouring landscapes as it should be in colouring portraits. Landscapes will stand rather more vivid colouring than portraits, because there are often many, many different colours with the sun in most cases playing on them, which of course intensifies the tints and makes them very brilliant, but the tints should never be applied stronger than they are found in nature's own painting. One should remember that it is always well to study the picture thoroughly before attempting to colour so that the best possible harmony of colour may be secured.

One can apply stronger colours in the foreground and to any particular objects in the foreground, such as flowers, rocks, etc. To these parts apply red, yellow or brown, as they may be required, to add brilliancy to the print. For detail work, use one of the Russian sable brushes, being very careful to apply the colours well diluted. If the tint is not strong enough, another wash can be placed over it until the colour is built up to the required density. Each application of colour will strengthen the tint and, as these transparent colours blend exceptionally well, there should be no excuse for streakiness or unevenness in applying the colours. If one should run over the outline just a trifle, it will matter but little as the tint will be so light, if it is properly handled, that the eye will never detect it. As a matter of fact, it is almost impossible to work to a clean-cut edge with the air brush without using a mask or covering the parts to be protected with frisket paper, but it usually is not necessary to do this except in special cases. The slightly softened edges impart a pleasing quality to such pictures and are characteristic of air brush work.

When working in the sky, always begin at the upper edge and work down into the picture. The blue tint should never be brought down to touch the horizon line. A little strip of clear sky should be left, over which may be placed a touch of yellow. This should blend softly and evenly. If a sunset effect

is desired, it can be secured by adding a wash of deep yellow or red just above the horizon line. If there are clouds showing in the picture, tint only the space showing between them with blue. If they are storm clouds, work over the blue between them with a stone grey and fill in the shadow in the clouds with a neutral tint to give them a fluffy effect. It is well to tint the light parts of the clouds slightly, to show the tints on them placed there by a sunset effect. This adds life and brilliancy to the print. If there is a stream or pond in the foreground, apply the same colours lightly over the reflections of the clouds in the water and the effect will be very good indeed.

The effect of distance, as stated before, is secured by lightly tinting distant hills and mountains with a purplish tint made by adding dilute scarlet to light blue, or by giving a dilute wash of light blue. These colours must be very weak, if they are at all too strong, the result will be a failure.

If there is much foliage shown in the foreground and middle distance, use, first of all, a light wash of foliage green. Remember that in the spring and early summer the foliage is greener and lighter in colour than it is later in the year. A few touches of burnt sienna, chrome and orange here and there will take away the monotonous effect of the green. Shadows should be touched with deep green and warm brown and the high lights with brilliant red or light yellow.

If there is a path or a roadway in the foreground, colour it with successive washes of light yellow and warm brown until the desired tint is obtained. Shrubbery in the immediate foreground may be coloured in the same way as foliage though in places it should be made more brilliant.

The one important thing to keep in mind in colouring any picture, whether it be a landscape or a portrait, is to be very careful not to use the colour too strong but to obtain the desired density by successive washes.

Light brown with blue or green
Scarlet with blue or green
Light green with blue or violet
Gold or yellow with blue or violet
Dark green with magenta or orange
Violet with light green or yellow
Flesh with blue or dark green
Blue with yellow or orange
Olive green with red or orange
Carmine with green or orange
Blue grey with buff or pink
Brown with blue or red
Orange with violet or blue
Neutral tint with red or yellow
Rose with light blue or yellow
Wine with yellow or light green

How to Mix Colours to Produce Some of the Principal Tints

Wine — violet and scarlet
Brick red — brown and scarlet
Tan — light brown and dilute orange
Blue black — deep blue and dark brown
Salmon — rose and dilute yellow
Bottle green — dark green and light blue
Seal brown — light brown and magenta
Cherry — dilute magenta
Purple — scarlet and blue
Dark red — scarlet and dark brown
Plum — violet and dark brown
Emerald green — light green and gold
Pink madder — scarlet and orange
Grey — violet and light green
Orange — scarlet and deep yellow

Grey blue — violet and light green
Olive green — deep yellow and violet
Gold — deep yellow and a little scarlet
Neutral tint — violet and dark brown
Lavender — dilute violet
Maroon — scarlet and dilute violet
Lilac — dilute violet

If these instructions are followed carefully and intelligently, there is little doubt but that in a comparatively short time an earnest student will be able to colour pictures in a manner that is both pleasing and profitable. In closing, the writer wishes again to impress upon the student's mind the true words of Van Amburgh: " Genius is the answer you get to the things you do while the world sleeps."

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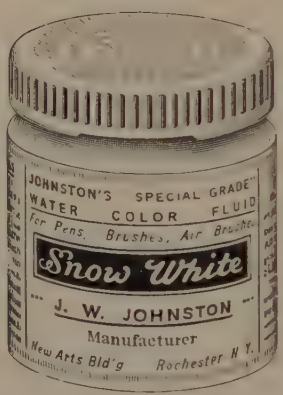

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